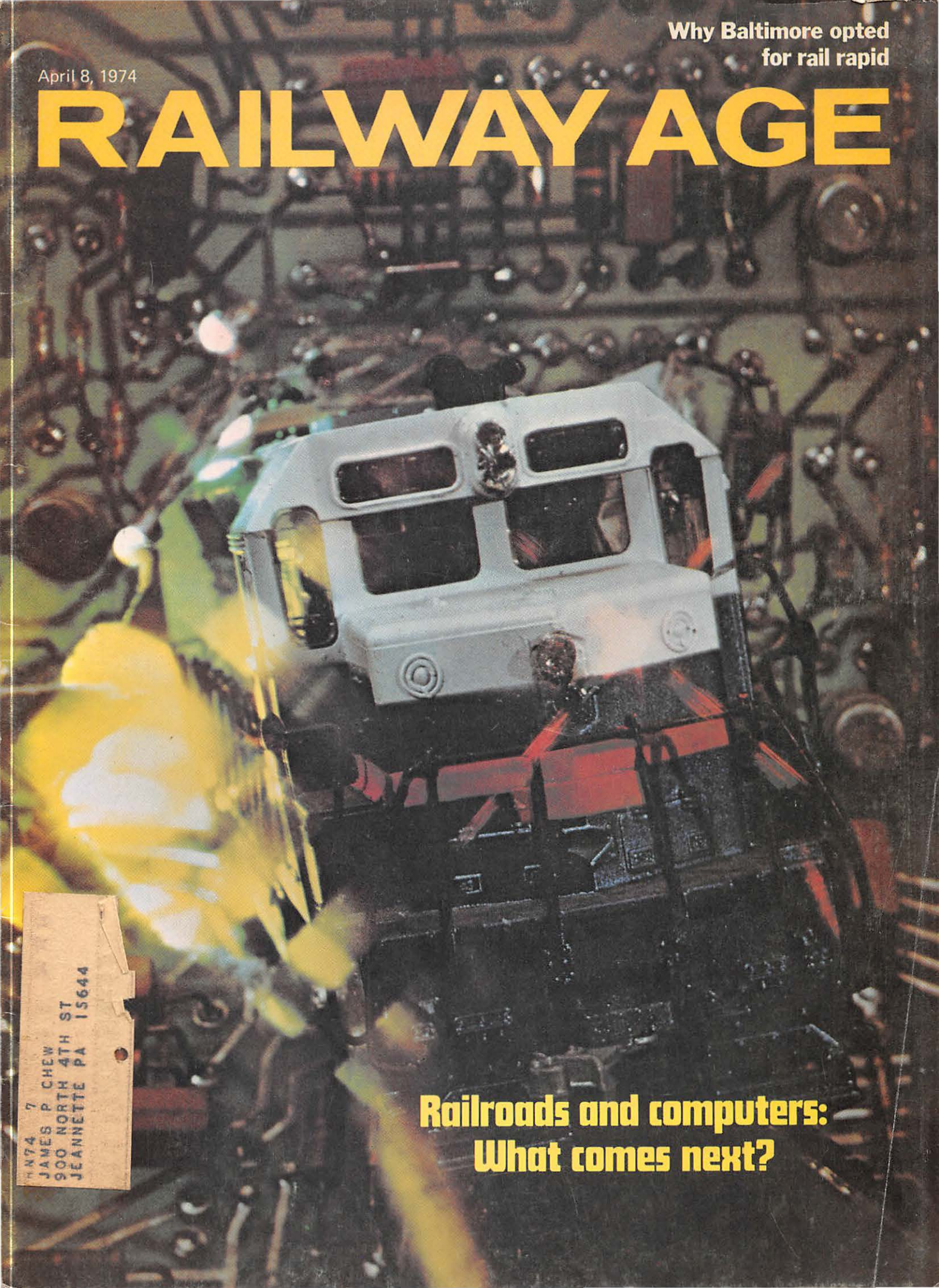
Why Baltimore opted for rail rapid

April 8, 1974

RAILWAY AGE



Railroads and computers: What comes next?

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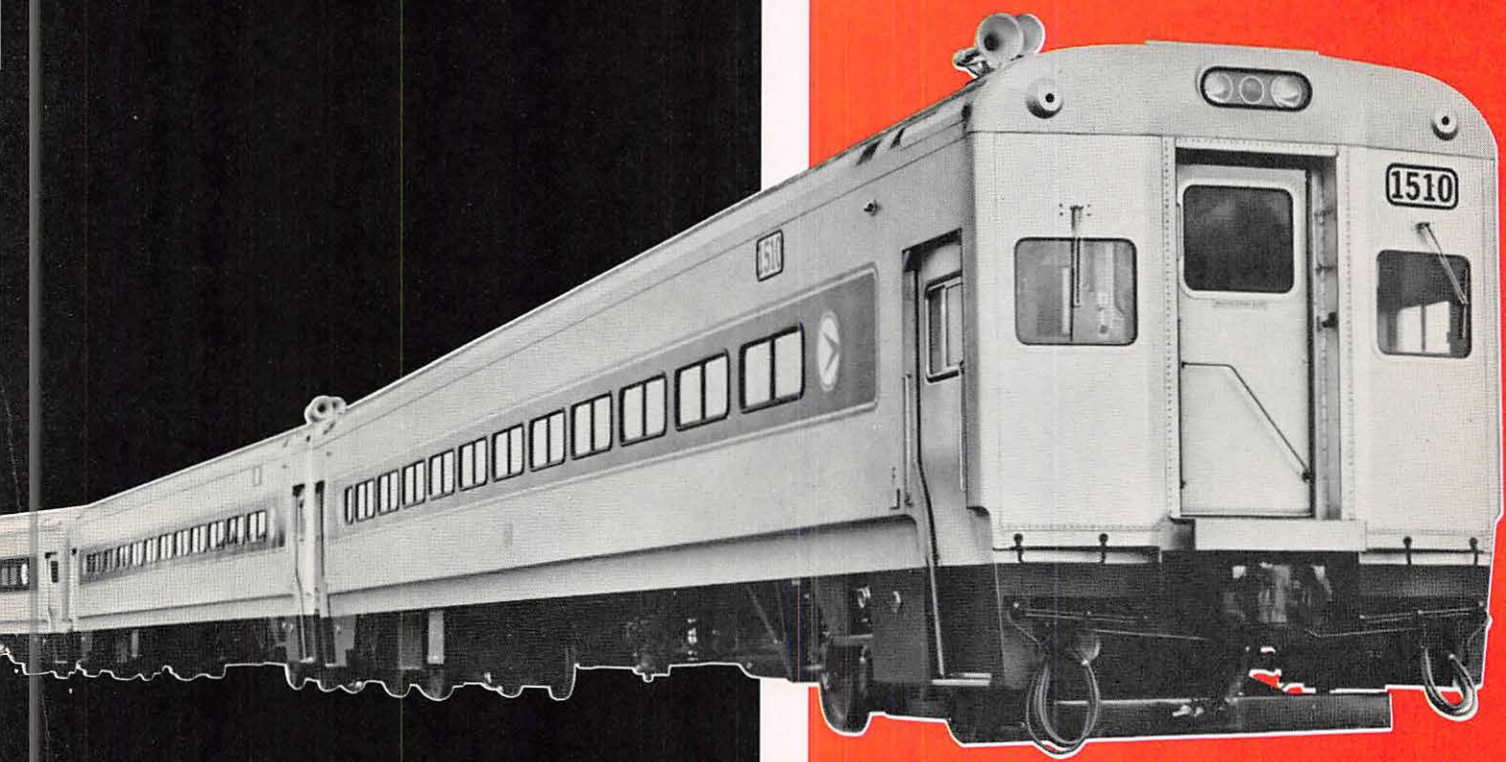

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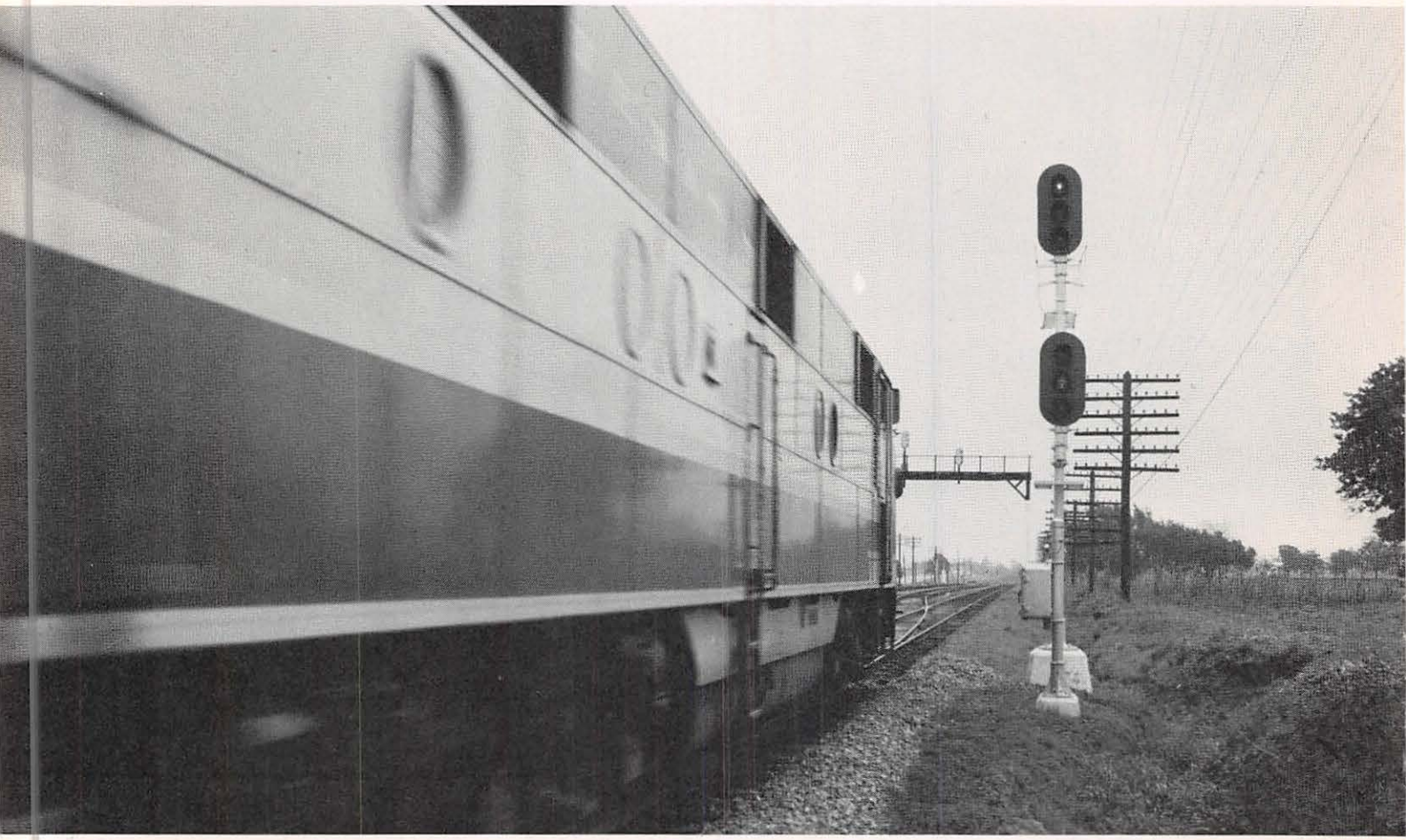

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Railway Age, established in 1856, is indexed by the Business Periodicals Index and the Engineering Index Service. Name registered in U.S. Patent Office and Trade Mark Office in Canada.
Published semi-monthly by the Simmons-Boardman Publishing Corporation, 508 Birch St., Bristol, Conn. 06010.
Railroad employees' subscription rate, U.S. possessions, Canada and Mexico, $8 one year, $12 two years, all others $17 for one year, payable in advance and postage paid. To railroad employees elsewhere in the western hemisphere, $20 a year; in the eastern hemisphere, $20 a year. Single copies 80¢, except special issues.
Address all subscriptions, change of address and correspondence concerning them to Subscription Dept., Railway Age, P.O. Box 530, Bristol, Conn. 06010.
Change of address should reach us three weeks in advance of next issue date. Send old address with new enclosing, if possible, your address label. Post Office will not forward copies unless you provide extra postage.

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Circulation Dept.: John Rogers Director of Circulation, 350 Broadway, New York, N.Y. 10013. POSTMASTER—SEND FORM 3579 TO P.O. BOX 530, BRISTOL, CONN. 06010.

Printed at the Hughes Printing Co.,34 North Crystal St., East Stroudsburg, Pa. 18301. Second-class postage paid at Bristol, Conn., and at additional mailing offices.

Inside

LUTHER S. MILLER

PERLMAN ON COMPUTERS

During the Third International Symposium on Railroad Cybernetics in Tokyo several years ago, Alfred E. Perlman observed rather testily that cybernetics was too important to be left to the cyberneticians—that top management, if it wanted to get its nickel's worth out of the computer, had to get more involved. With the Fourth Symposium now coming up (in Washington April 21-26), we thought it appropriate to ask Mr. Perlman if he thought his criticism still to be a valid one.

"Yes," said Western Pacific's chief. "Unless top management *is* fully involved and understands the problems, we're not going to make the progress we should. Leaving the data output in the hands of hardware technicians or computer 'experts' just turns out a lot of extra material and reports that many of the users don't get the greatest benefit from.

"The using departments and the chief executive know what they need for the control of their department or their enterprise. And if they are getting data in the form that isn't the most helpful, or if they are getting the kind of data that doesn't contribute to current control and current communication, then they are not getting their money's worth. They are, in fact, wasting money.

"THE SCIENCE OF COMMUNICATION AND CONTROL"

"After all, cybernetics is the science of communication and control—and if the recipients are not getting the tools to advance communication and control, but are getting instead a lot of things they don't need, then they are spending too much money for what they are getting."

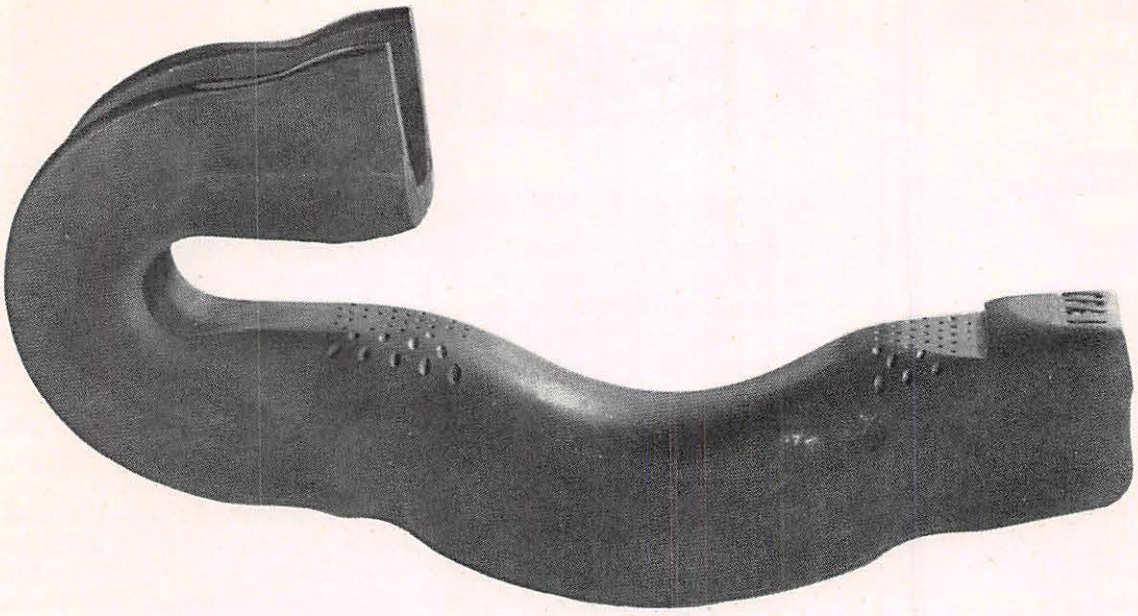
Asked if he could cite an example where the lack of top-management involvement had been a problem Mr. Perlman said he could, and he did:

"When the creation of the Telerail Automatic Information Network was first considered by the AAR—TRAIN I as it's called—the chief executives of some of the roads that were considered to be the most progressive fought it very bitterly. But see what has happened. We now have TRAIN I—and as a result the AAR's inventory of empties all over the United States is now only two to four days old, where it used to be two or three months old. The fact that we *did* have TRAIN I was of great benefit in moving the grain crop last year so expeditiously and so well. The AAR had full control of the empties, and understood where they were located."

While he is still critical of the misuses and (non-uses) which he feels abound in the field of railway cybernetics, Mr. Perlman nonetheless feels, he says, that "great strides" have been made since the first symposium in Paris 11 years ago.

THE END OF THE BEGINNING

We hope, and expect, that this latter opinion will be reinforced by a reading of Senior Editor Gus Welty's cover story on computers and the railroads (p. 20) which suggests that, while there may still be a long way to go in the application of the science of cybernetics to the art and craft of railroading, we have at the very least reached the end of the beginning.



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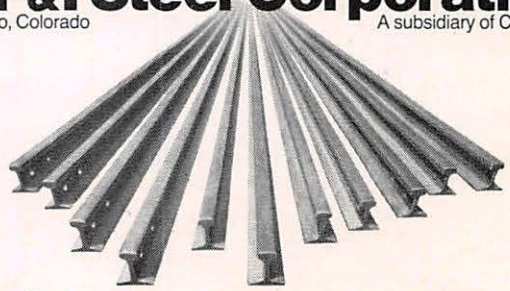

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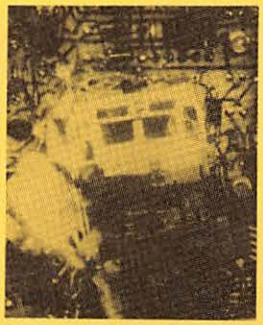
RAILWAY AGE

APRIL 8, 1974

FEATURES



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Short and Significant

1974 CAR ORDERS REACH 17,977

Through the first two months of 1974, car orders were running well ahead of the comparable period of 1973, which ended up setting records. In 1974, 17,977 new freight cars had been ordered through February, up from 15,236 a year earlier. It had been 22 years since carbuilders had had a backlog like the 70,922 undelivered cars on March 1, 1974. The railroad shop backlog was 4,306 cars on March 1. In February 1974, carbuilders got orders for 6,231 cars and railroad shops booked 500.

NW'S FISHWICK CALLS COMPETITION VITAL

While he pledged Norfolk & Western's "priority attention and energies" to Northeastern restructuring, NW President John P. Fishwick has warned ICC that success requires a balance of competition in the area. "It is no solution to cure the present problems of some railroads by shifting them to other railroads or to create a Frankenstein capable of survival at the price of destruction of all around it," he said. Suggesting that Penn Central might have to be broken into the components from which it was formed, Fishwick noted that competitors "must operate on some degree of parity to realize the ideal of competitive service and, in fact, to insure the survival of each."

CN BUILDING NEW FREIGHT ROUTE

A $13-million, 18½-mile cutoff is being constructed in eastern Quebec to speed Canadian National's freight service between Montreal and the Maritime provinces. The line, with fewer grades and curves than that presently used by CN freights, will be ctc-controlled and will have concrete ties and 132-lb rail. It will connect CN's main passenger line along the St. Lawrence at St. Andre with the former National Transcontinental route at Pelletier, cutting 38-miles and up to 2½ hours off CN freight schedules. Aerial and on-site surveys have been under way for a year and contracts are being let for clearing the right-of-way.

E.G. JORDAN HEADS USRA

Edward G. Jordan has been named president of the United States Railway Association, the organization established for planning the restructuring of midwestern and northeastern bankrupt railroads. Jordan, 44, had been president of Pinehurst Corp., a California-based insurance services company. Alan L. Dean, who has been in Federal posts since 1941, is vice president-fiscal and administrative services. Paul F. Cruikshank, Jr., president of Fort Worth & Denver, has been appointed vice president-planning and coordination, and James A. Hagen, associate Federal Railroad Administrator, has been named as USRA's vice president-operating and facilities planning.

THE ROSEVILLE BLAST: CAUSE UNKNOWN

Because of the nature of the accident and the widespread destruction resulting, investigators have been unable to determine what caused ammunition-laden DOD box cars to explode last April 28 in Southern Pacific's Roseville, Calif., yard (RA, May 14, 1973, p. 18; May 28, 1973, p. 76). After intensive study by the railroad and a variety of Federal agencies, about all that can be raised are possibilities—that the series of explosions might have been touched off by a fire started by sparks from braking action and the resulting exposure of a bomb to heat; or that there could have been one or more unstable bombs in one of the cars. Last August, FRA did issue an emergency order providing that cars transporting Class A explosives be equipped with low-sparking brake shoes and either a continuous steel sub-floor or metal spark shields. In its current report, FRA also recommends that the U.S. Navy—which manufactured the bombs and supplied the cars—reexamine manufacturing and loading procedures at the points where the bombs were produced. No evidence was found to indicate that the explosions occurred as the result of sabotage.

ICC ACTS IN FERTILIZER SQUEEZE

In an attempt to get adequate fertilizer supplies into regions of the U.S. which produce feed grains and other agricultural commodities, ICC has ordered 11 railroads to deliver 100 covered hoppers each to Seaboard Coast Line. The cars will move phosphate from SCL's Florida mining area to points in the U.S. where the Federal government is trying to maximize farm production. Each delivered car must be capable of carrying not less than 70 tons, ICC told Burlington Northern, Chessie, Milwaukee, North Western, Rock Island, Illinois Central Gulf, Louisville & Nashville, Missouri Pacific, Norfolk & Western, Penn Central and Frisco.

CANADIAN ROAD WILL BE CARBUILDER

British Columbia Railway, provincially owned successor to Pacific Great Eastern, will begin building its own rolling stock in August with the opening of its new $5-million car plant at Squamish, B.C. The first units will be its own 300 woodchip cars but BCR is looking for other customers.

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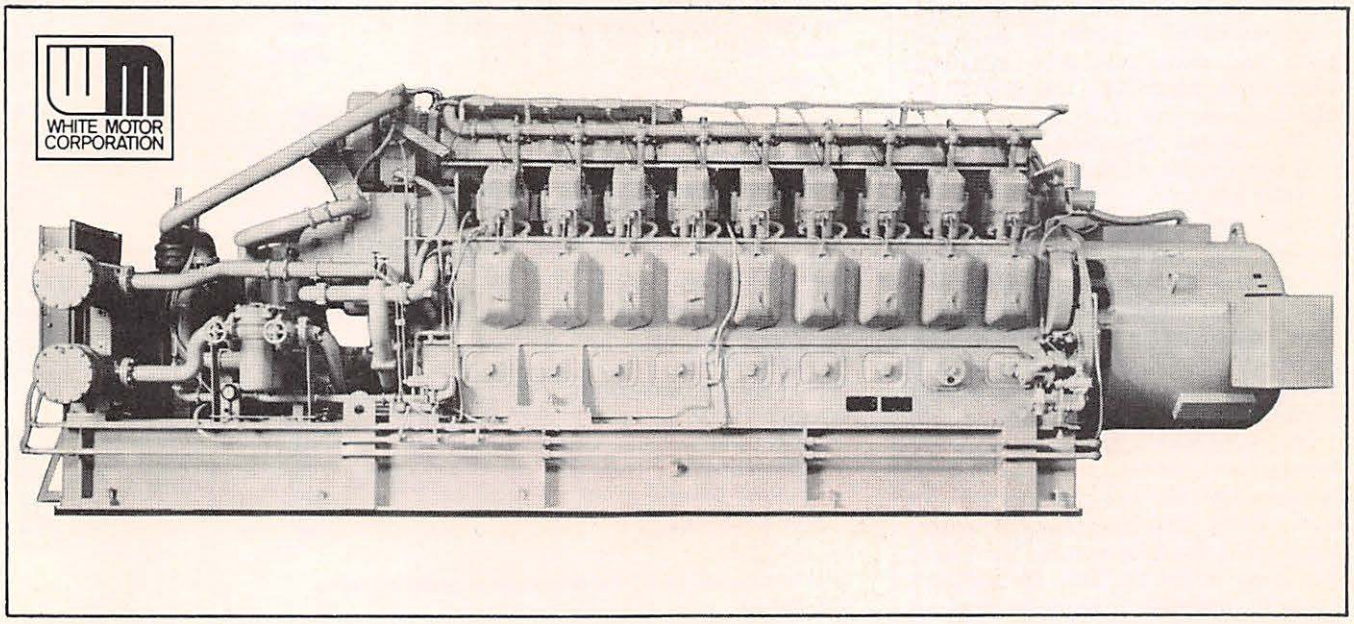

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Railroad rate of return edges past 3%

Railroads have finally closed the books on '73—and all things considered (e.g., inflation; the eastern bankruptcies) it was a pretty good year. The bottom-line figure of $558 million for the industry as a whole was a 15.6% improvement over the $483 million in net income reported for 1972.

Gross operating revenues for the year added up to an all-time record high of $14.8 billion, up 10.1% over 1972. Unfortunately, operating expenses, taxes and rents rose at a somewhat steeper rate, from $12.6 billion to $13.9 billion, an increase of 10.5%.

Net railway operating income rose only slightly, from $830 million in 1972 to $859 million.

The $75-million increase in net income was attributable primarily to higher earnings from non-transportation sources. (Net income differs from operating income in that it is calculated after income from non-railroad operations is added and interest on debt and other fixed charges are deducted.)

The industry's rate of return on net investment rose in 1973 to 3.08%. Noting that this was the first time in seven years that the rate of return topped 3%, the AAR pointed out that it was "still below the 10% the industry needs to maintain a requisite level of investment in needed equipment and facilities."

Of the 64 Class I railroads included in the AAR's final tally of 1973 results, 16 operated in the red. Twelve of these were in the East, three in the West and one in the South.

Ordinary net income in the fourth quarter of 1973 rose to $203 million, up from $180 million a year earlier. Net railway operating income for the quarter totaled $282 million, up from $248 million in the same 1972 period. Operating revenues rose 12.3% to $3.9 billion, while operating expenses, taxes and rents rose the same percentage to $3.6 billion.

How about 1974? Right now it appears to be shaping up as pretty much of a repeat of 1973, with revenues apparently headed for another record (both carloadings and ton-miles have been running ahead of last year's levels) but with inflationary pressures still keeping earnings far below a healthy level. One Wall Streeter predicts: "The poor will get poorer and the rich—relatively speaking—will be hard put to stay that way."

At the far end of the spectrum, the Penn Central so far is doing even less well in the income column than it did in 1973. Late in March PC announced that its net loss for the first two months of the year amounted to $58.4 million; that was $12.7 million worse than the $45.7 million loss recorded in the corresponding period of last year.

While PC's revenue rose along with those of the industry generally in the first two months, PC had its own set of problems. The trustees noted that "aside from inflated fuel and material costs and a higher wage level, Penn Central's transportation and other operating expenses were sharply increased by slow order track which has more than tripled since bankruptcy." During February, said the trustees, movement of trains had to be slowed over 8,200 miles of track—some to less than 10 mph—and the number of derailments increased by 137% over February 1972.

At the other extreme, the Chessie System, which had earnings of $67 million in 1973, is looking for something approximating a repeat in 1974. Chessie President John W. Hanifin told shareowners at their March 26 annual meeting at Richmond, Va., that 1974 was shaping up as "a worthy successor to 1973."

While Chessie has experienced some not-unexpected reverses so far this year (loadings of autos and auto parts dropped around 30% in the first quarter), it is also having its successes. Hanifin said coal traffic revenues would be up around 28% in the first quarter. Merchandise traffic revenue is also running slightly ahead of last year's high levels—partly, said Hanifin, because "shippers and truckers have been making greater use of Chessie's piggyback trains to conserve their own fuel."

CLASS I RAILROADS IN THE UNITED STATES

For the Calendar Year

	1973 (millions)	1972 (millions)
Operating revenues	$14,796	$13,440
Operating expenses	11,571	10,580
Tax accruals	1,353	1,148
Rents (net debit)	1,013	882
Net railway operating income	859	830
Rate of return	3.08%	2.96%
Ordinary income:*		
United States	558	483
Eastern District	Def. 130	Def. 165
Southern District	215	199
Western District	473	449

For the 4th Quarter

Operating revenues	$ 3,913	$ 3,484
Operating expenses	2,990	2,726
Tax accruals	384	280
Rents (net debit)	257	230
Net railway operating income	282	248
Ordinary income:*		
United States	303	180
Eastern District	Def. 26	Def. 23
Southern District	65	53
Western District	164	150

*Net income before extraordinary and prior period terms
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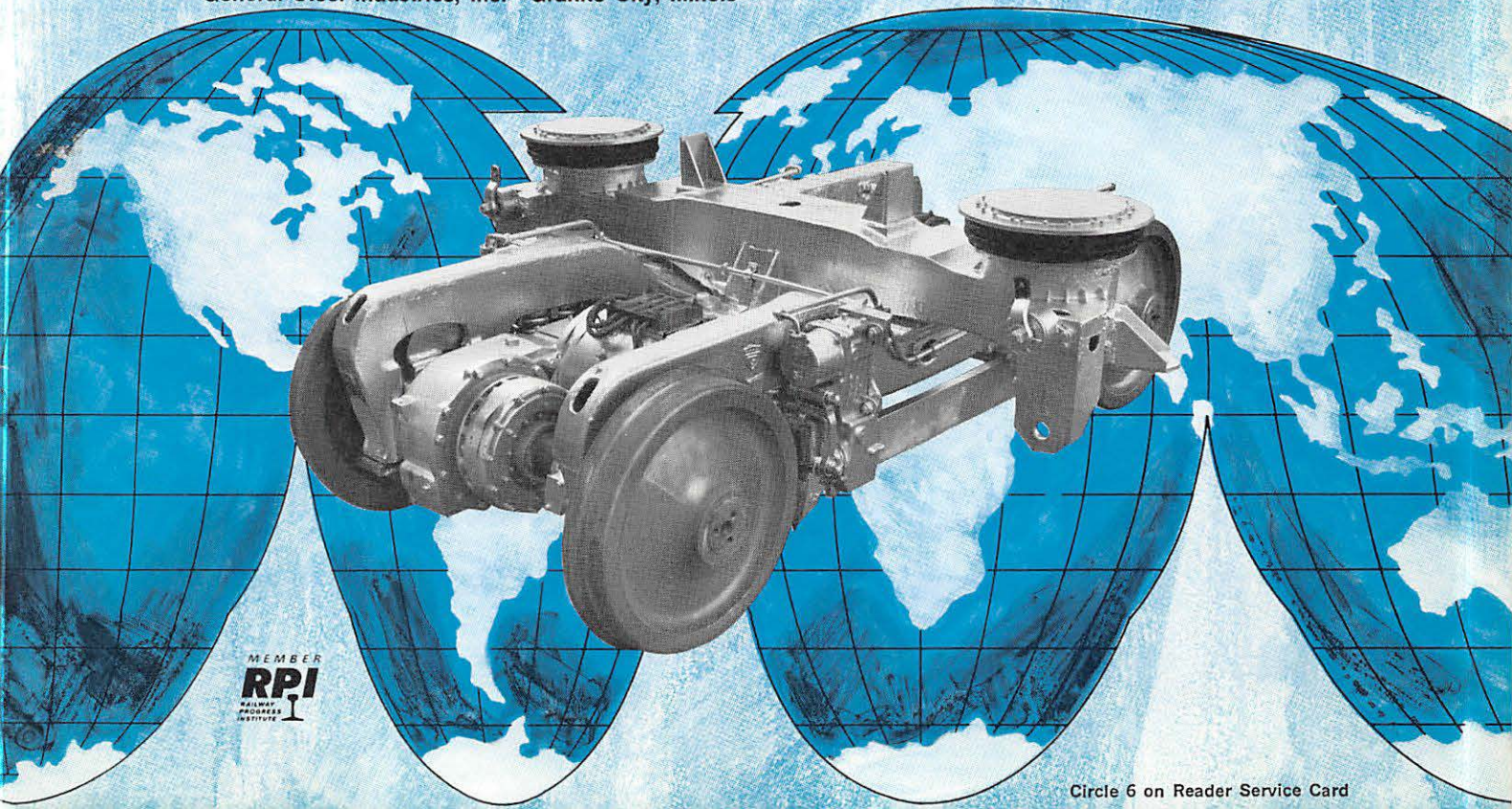

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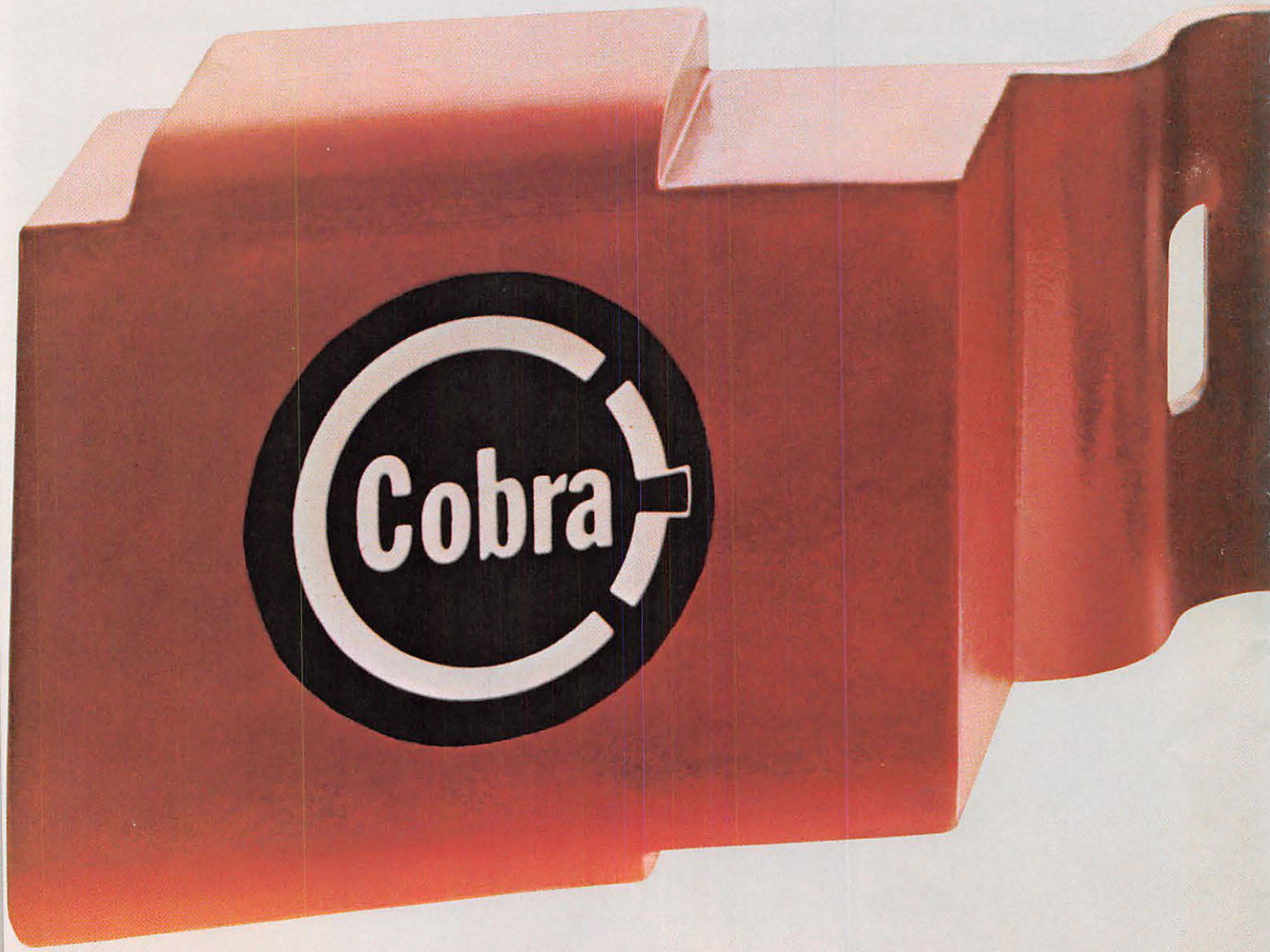

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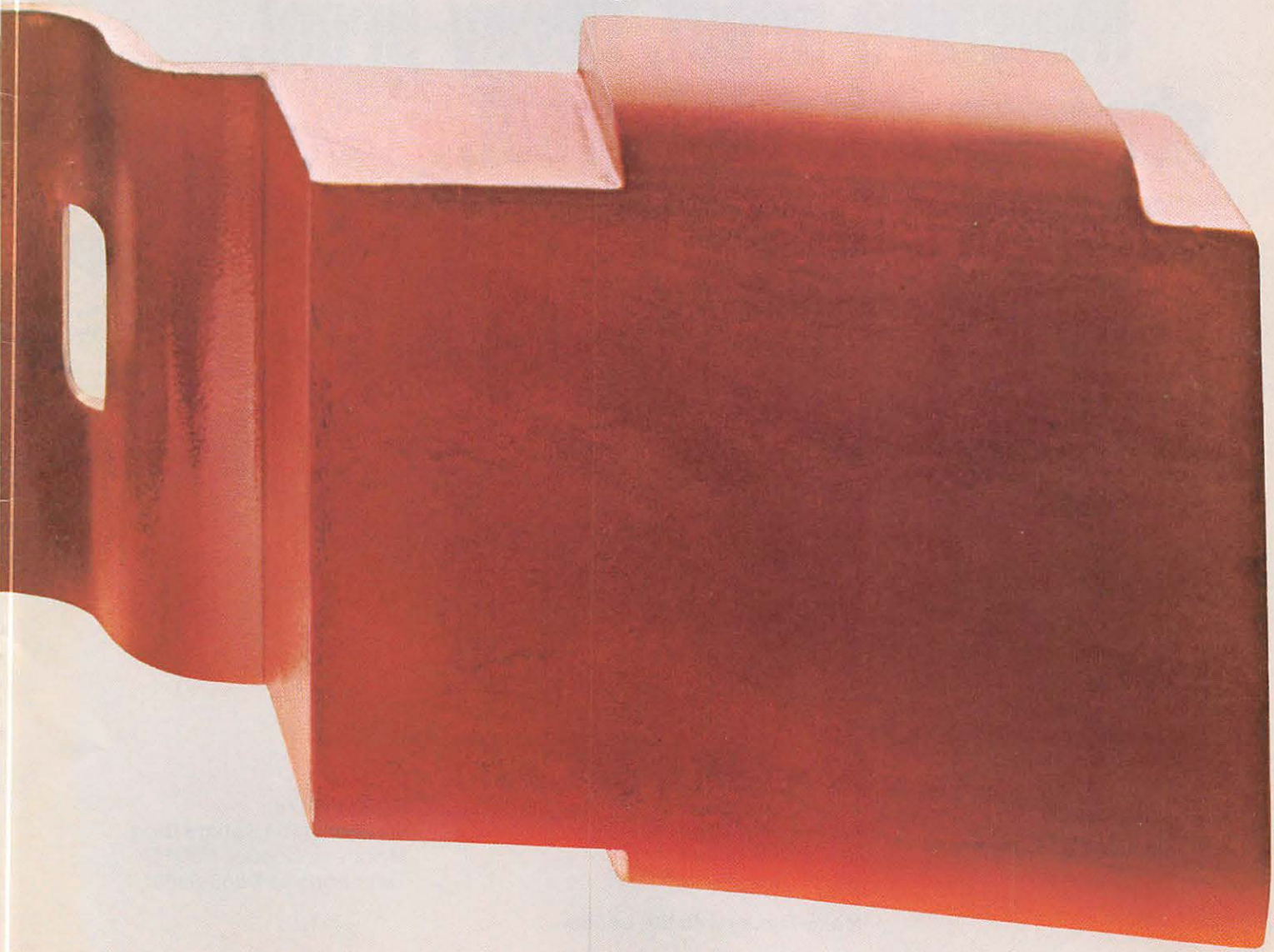

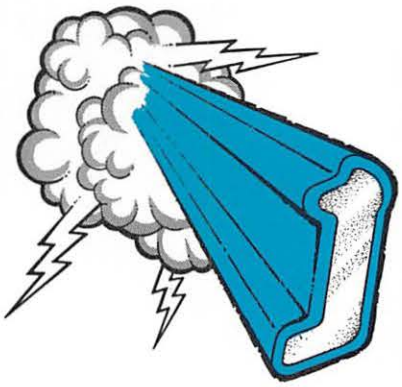

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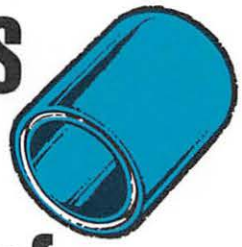

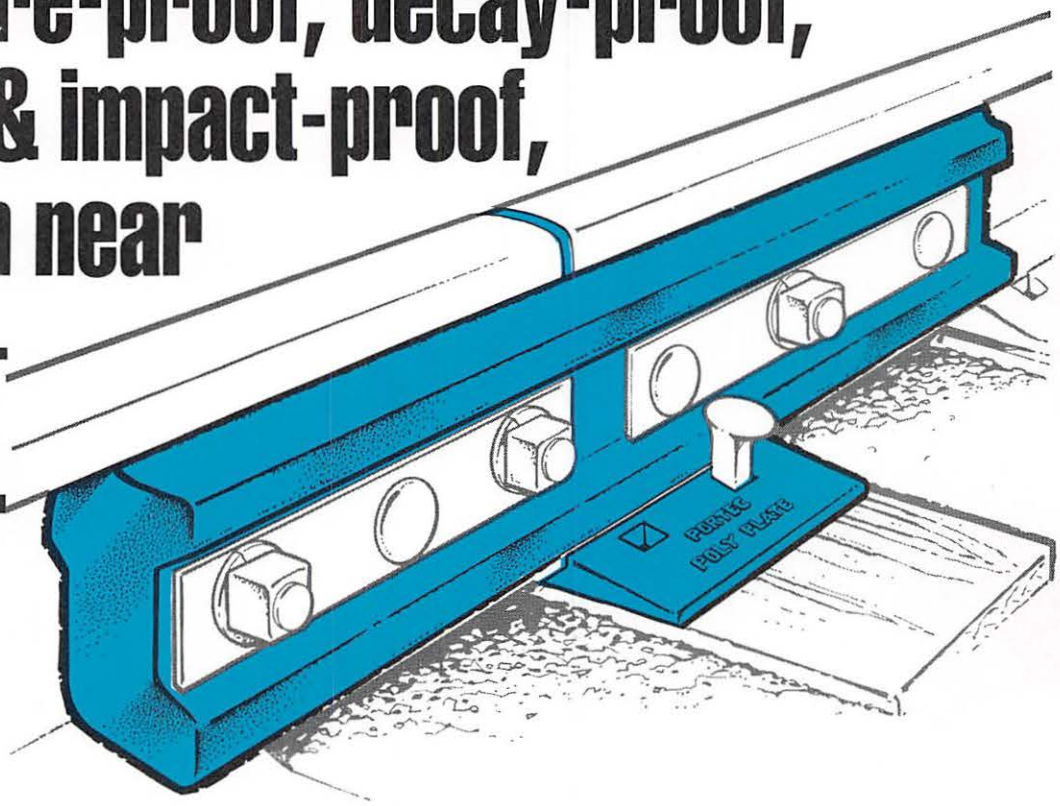

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R.M.M. McCONNELL

"RAILROADS ARE IN A MESS"

A strong warning from Secretary of Transportation Claude S. Brinegar that the nation's railroads face the possibility of nationalization highlighted the first day of what promises to be a long series of hearings before the Transportation and Aeronautics Subcommittee of the House Commerce Committee. The subcommittee is listening to testimony on several major transportation bills, including the Surface Transportation Act, the Nixon Administration's Transportation Improvement Act, and a new Rail Freight Transportation Improvement Act introduced by Washington Democratic Rep. Brock Adams.

Speaking in support of the Administration measure, Brinegar told subcommittee members that "the railroads are in a mess." Industry profitability is so low, he pointed out, that the railroads cannot afford improvements to facilities, and in many cases can't even afford routine maintenance. This drives business away from the railroads to other carriers, reducing the profitability of the railroads, and contributing further to their deterioration. This cycle has to stop, Brinegar said. The key to stopping it, he added, is the Transportation Improvement Act, which provides for needed deregulation of the railroads and increased government financial assistance. In addition, TIA would reduce the power of rate bureaus to set freight rates, thereby allowing railroads to raise and lower their rates to suit market conditions.

FEARS EFFECT ON OTHER MODES

This provision is the take-off point for the new Adams measure. Drawn from the financial assistance section of STA, Adams's Rail Freight Transportation Improvement Act is in part a reaction to TIA provisions that the Congressman apparently feels go too far in allowing railroads to cut their freight rates. Adams is concerned that the rail industry could in some cases cut rates so low that other carriers would be crippled. In addition, the Adams bill provides some protection for labor, although not as much as labor appears to want. The United Transportation Union commented that "although the bill contains worker protective conditions similar to the Amtrak conditions, it does not contain the stronger protection features sought by rail unions."

AND THEN—THE COMPROMISES

Introduction of the Adams measure at this time appears to be largely a tactical step. It is obvious that whatever legislation emerges, it will be the result of compromise among conflicting forces. On this issue, the compromises will probably be easier to arrive at than on most, since—as Adams put it when he introduced his bill—"I am happy to say that the question of a Federal assistance program is a bi-partisan one." In this light, Adam's bill appears to be a wedge that can be used to ease the opposition of other carriers to legislation aimed at helping the railroads; help muster labor support for such legislation; and allow Adams to lever support away from TIA to his own STA, making the basis of what some believe will be an omnibus bill.

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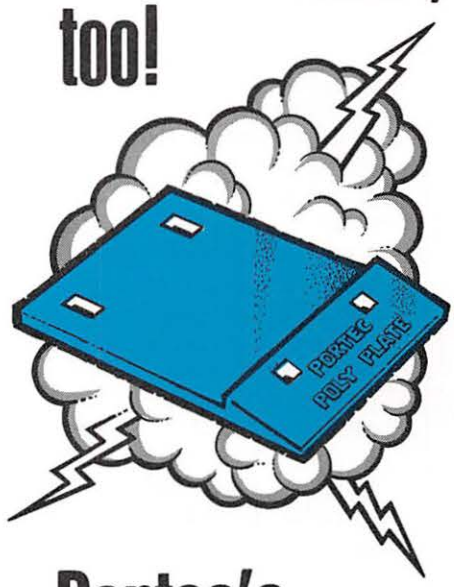

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Lines on Labor

GUS WELTY

TOMORROW'S NOT TODAY

It grows stronger and stronger—the feeling that railroading five or 10 or 15 years down the line is going to be a different if not an altogether-new ball game. There are, of course, obvious reasons for thinking this way—the obvious ones having mostly to do with external factors which will be affecting the industry. For instance, economic growth and increased demand for good surface transportation. . .government's increasing and, hopefully, increasingly-helpful role in promoting sound transportation policy. . .the continuation of the environmental movement and its impact on railroads, the "clean" guys in the bunch. . .the energy problem, which will be around for a long time in one degree of severity or another. Somewhat less obvious, perhaps, are internal changes which may also reshape what we now know as railroading.

WORKING ON A NEW KIND OF RAILROAD

What's happening on the inside? This issue of Railway Age (p. 20) gets deeply into one set of fast-changing circumstances, involving Phase 2 of railroading computerization. Then, there will be significant changes in train operations coming up, with more runthroughs, for example, and a lot more unit trains, a lot more TOFC/COFC. There will be a strong, broad emphasis on transportation quality control, not just in areas such as loss-and-damage prevention, but in all aspects involved in providing a high-quality service. The hardware of railroading could change dramatically, as an outgrowth of such things as track/train dynamics studies and industry/government interests in electrification. If you add up all the changes that have a good chance of coming about, you come to a conclusion: Railroading can provide an eminently-satisfactory work environment for properly-trained, properly-motivated people.

As was also pointed out in a recent issue of Railway Age (Feb. 25, p. 16), railroads are rapidly changing from an under-trained to a well-trained industry at almost all levels of the work force. But, upcoming changes will challenge all that. Upcoming changes will also give the industry a chance to prove it has learned from past motivational errors. Take just one for-instance, Phase 2 of computerization, which quite likely will see the decentralization of computer power and computer application into the field and deeply into actual operations. In Phase 1, back in the 1950's and '60's, railroads did what would be politely described as a bad job of motivating. For both supervisors and contract employees, the computer came to be regarded as a threat. For some people, it added to the work-load. For others, it means unemployment. And no matter how well-motivated an individual may be, if you lay on him feelings of uncertainty and insecurity, motivation will dry up. Systems experts will rather freely admit today that systems development would be farther along *if* more attention had been paid years ago to human elements. Phase 2 shapes up, fortunately, as something different: Its potential benefits will be carefully spelled out. Training in its applications will be painstaking. The upshot, hopefully, will be that employees will be more inclined to caress than to kick the black boxes. Motivation/training? Old-time railroaders would probably swear at it. Tomorrow's railroaders will swear by it.

SP capital outlay to be $241 million

While Southern Pacific's operating income from its rail services dropped by $9.4 million (under 7%) between 1972 and 1973, gross reached an all-time high of $1.37 billion last year and President B.F. Biaggini is optimistic about 1974. So optimistic, in fact, that SP has budgeted $241 million for railroad capital projects in 1974 and was prepared to spend $15 million more, but for the slow deliveries it will be getting on rolling stock it has ordered.

Over the 1964-1973 decade, SP has invested $1.6 billion in new rail facilities, augmented by $109 million more in equipment leases. Only with such investment has it been possible for SP to improve operating efficiency so it could minimize rising costs and keep its rail services cost competitive. Biaggini has noted that cost control has been significantly aided by "the most outstanding performance" in the railroad industry in getting rid of unproductive facilities. Despite some new line construction, SP has reduced its route mileage by 19% over the past 30 years, although this did include sale of the 1,250-mile SP of Mexico in the early Fifties.

Today's 13,600-mile system is producing revenue ton miles like it never did before; last year's 83 billion represented an increase of fully 24% over 1967. While car shortages have affected segments of SP's traffic, there are numerous bright spots—some very bright. Piggyback loads were up 20% in 1973 over 1972 and the first two months of 1974 produced a 25% growth over the comparable 1973 period. SP piggyback revenue will top $100 million this year. SP is bullish on forest products, perishables, ores, fuels, paper and manufactured products. Revenue from automobile traffic may be down 15%, but could rebound later in the year.

SP is acquiring 64 locomotives and 5,616 cars at a cost of $150 million, making roadway investments of $61 million and will shop 6,000 cars which will represent a capital investment of $29 million. SP expects fuel to cost it over $92 million in 1974, compared with $52 million in 1973. Some suppliers did not meet their fuel commitments, but SP has experienced no service disruptions.

Although SP was a leader in study of electrification in the late 1960s, Biaggini has been glad that was as far as it went. "Any road which would have electrified in the past ten years would have been in trouble recently as utilities restricted power supply," he added. However, SP continues to participate in Federally-sponsored investigations of electric operation.

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AREA president to members:

"Brickbats, not bouquets"

To his friends and associates, Don Sartore, chief engineer-design of the Burlington Northern, is known as a patient, mild-mannered, soft-voiced individual with an even disposition. But the annual technical conference of the American Railway Engineering Association had hardly gotten under way at Chicago on March 18 before this assessment of his character was being quietly revised in the minds of many people in the audience.

Cause of the reassessment was an address that Sartore, as president of the association, had prepared for delivery at the opening session of the conference. The address left no doubt in the minds of listeners that Sartore was deeply dissatisfied with the performance of the association's technical committees.

Instead of expecting bouquets, he told his listeners to "get ready for the brickbats—there will be some coming." Since Sartore at the time was confined to his hotel room with a virus infection his address was read—with emphasis and obvious appreciation—by Earl W. Hodgkins, AREA executive director.

● **Polite "brickbats."** As might be expected the verbal "brickbats" contained in the address were couched in polite terms, although the meaning was unmistakable. When paraphrased and summarized in less polite language the message might read something like this: "All right men, let's cut out this dawdling and procrastination. You are taking entirely too much time to prepare reports. Furthermore, because members of subcommittees are not doing their job, the subcommittee chairmen have to do all the work. Also, let's stop trying to solve yesterday's problems, and get on with the business of anticipating problems and trying to come up with the answers."

The first few paragraphs of Sartore's address read as if it were going to be a typical message from an association president recounting the objectives of the group and relating how well they were being carried out. In fact, he said that "we can be proud of ourselves" in regard to the technical conference and the regional meetings. "We have altered our format in the last few years to be more receptive to the needs and desires of the individual members. . .I believe we rate an 'A' here." Then, in setting out to examine the technical committees, he expressed the opinion that "*what* they accomplish is fine," but then he quickly added that he is "not convinced that they accomplish enough, or do it in timely fashion."

Then came the remark warning the members to expect "brickbats" instead of bouquets.

After making the point that "we cannot afford to waste our efforts in doing things too late to be most effective," Sartore asserted that timeliness was number one on the list of things he feels "we are not accomplishing." He spelled out his reasoning.

● **Committees' "not time-sensitive."** "There are several exceptions, but for the most part, our committees are not at all time-sensitive. It sometimes takes years, literally, to turn out a report. We just *cannot* allow this practice to continue. We *must* speed things up."

The next point mentioned by Sartore was that *all* subcommittee members should produce instead of requiring the subcommittee chairman to do most of the work. "This in itself slows things down," he said.

With AAR's new emphasis on laboratory research, "we must learn to set up tests on our individual railroads."

D.V. Sartore
Burlington Northern

He is also opposed to the practice of the committees' getting unanimous approval on all matters, "often delaying action for months in order to do so." He reminded the members that the AREA issues recommended practices only and that no one is bound by its decisions. "If a majority are in agreement let's get it out where the majority can use it now, not two years from now."

● **Need to look ahead.** Getting back to the subject of timeliness, Sartore mentioned another "item I believe we should address ourselves to in our committees—and that is to looking ahead. Not enough of the subjects suggested for study by our committees look to the future. They are related to solving yesterday's problems. We must learn to act, not react—be leaders, not followers."

The conduct of service tests is one way of looking to the future, in Sartore's view. He noted that the AAR laboratory had formerly conducted a large number of tests for AREA committees but that this testing has been "drastically reduced" as a result of the reorientation of the laboratory to research rather than testing, which, he believes, "is right for maximum long-range benefits."

As an alternative to the AAR testing, Sartore said "we must learn to set up tests on our individual railroads." This is being done on an increasing scale and "very satisfactorily," he said. He believes that a field test is better than a laboratory test in many ways, "but we must look to the future and start the tests before the results are needed, since field tests do not provide the accelerated results obtainable in the lab."

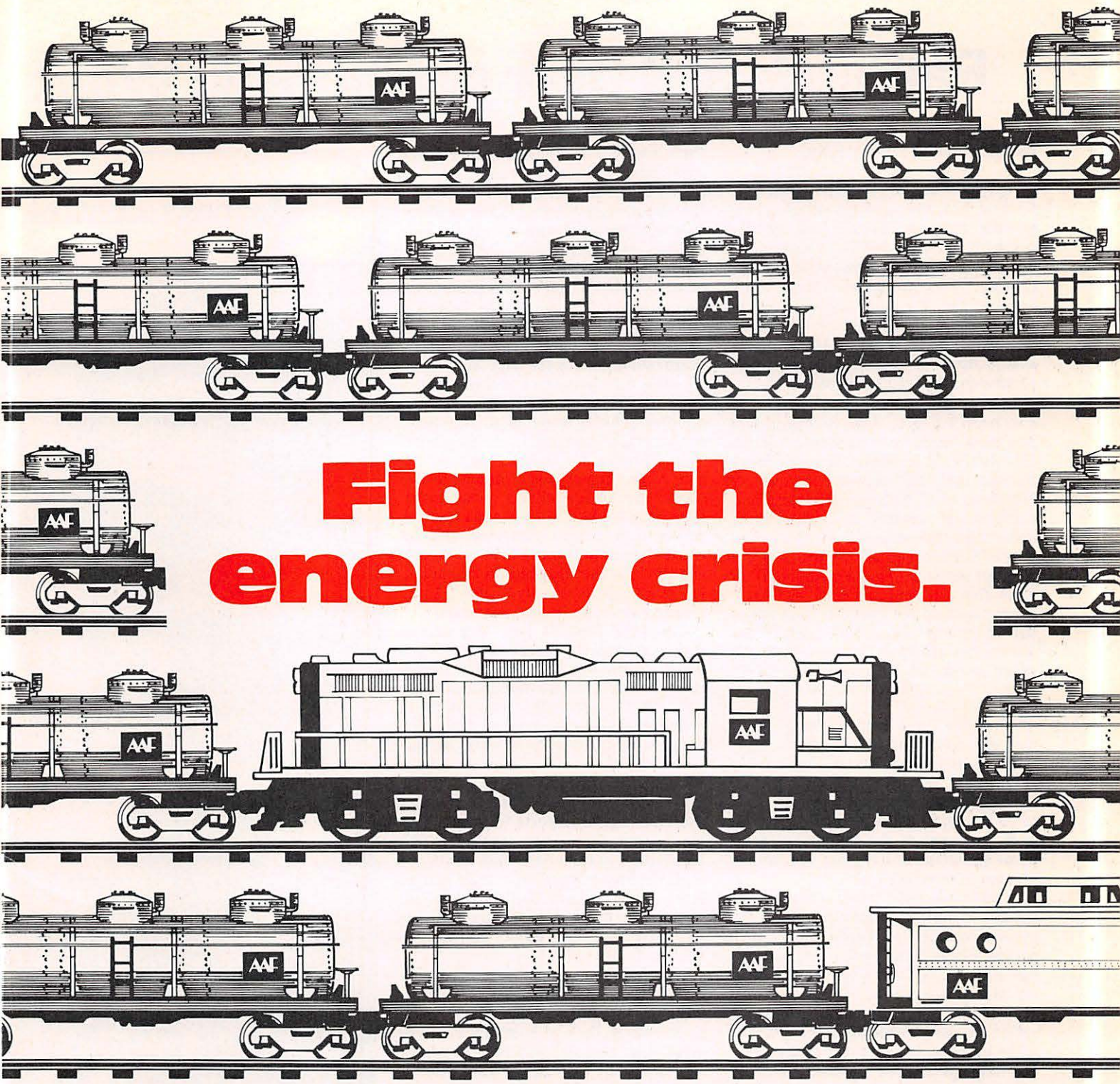
● **"Cut out the deadwood."** In making his final point regarding the committees, Sartore said "we must cut out the deadwood." He added: "This applies not only to the members who do not attend meetings or answer correspondence but to the members that do not contribute at meetings or in their correspondence. If we reduce our committee rosters to assure that every member is contributing, we may find all members allowed to attend meetings."

Sartore would also be "more flexible in bringing specialists into the committees for certain assignments where they have expertise, then allowing them to drop off when the final report is made." But he had a word of caution on this point. "We must be certain we always allow room for a few of our younger members to participate in committee work—I feel it provides an excellent opportunity for them to broaden their knowledge at small cost."

Summarizing his position, Sartore said he believes "we should alter the philosophy of our committees from that of a large group on which most railroads are represented and where decisions are usually unanimous, to one of a smaller, representative task force where majority rules."

In a conversation later about Sartore's address, a long-time member of the AREA observed: "We had that coming; it was long overdue."

—Merwin H. Dick



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Railroads and their computers: What

By GUS WELTY, Senior Editor

U.S. railroads are perhaps neither the farthest nor the least advanced of the world's railroads in the use of the computer—a proposition which quite likely will be demonstrated at the upcoming Fourth International Symposium on Railroad Cybernetics in Washington. But, precisely how advanced are U.S. roads? More importantly, how far can they go with the computer over the next decade?

The emphasis was on the future, in conversations with J.W. Germany, vice president-management services of Southern Pacific; J.L. Jones, vice president-management information services of Southern; P.E. Odom, vice president-management services of Frisco; W.C. Prinn, director-advanced systems planning of Chessie; and M.D. Sims, assistant vice president-systems development of Penn Central. And where do U.S. railroads stand at this instant, in terms of the "computer revolution?" Where the Minutemen stood at Concord bridge. In other words, at the end of the beginning.

There's a limit, somewhere, to what man-plus-computer can do. But, so far as railroads are concerned, that limit is nowhere in sight—for information systems and especially for what have come to be known as process-control systems.

If you explore the thinking of computer specialists today, you can draw a number of conclusions:

—Railroads have barely scratched the surface in the use of the computer for process-control. It's here-and-now in a comparatively few yard operations. It can go a lot farther in this area, and in actual train-operation.

—Computer-to-computer communication is also here-and-now, and for some purposes it's a valuable capability. But it's not an end in itself, and the railroad systems designers are well aware of the need to resist any urge to install computer/computer hookups merely because they are technically feasible.

—Biggest benefits from continuing development of systems may accrue to operating management. Ironically, operating management may still be the most reluctant of management groups to accept help computers can give.

—The so-called interface of man and machine will be a problem for a long time to come. But it's not the problem today that it was five years ago, and the situation will continue to improve as the people who produce the data and the people who use it get closer together.

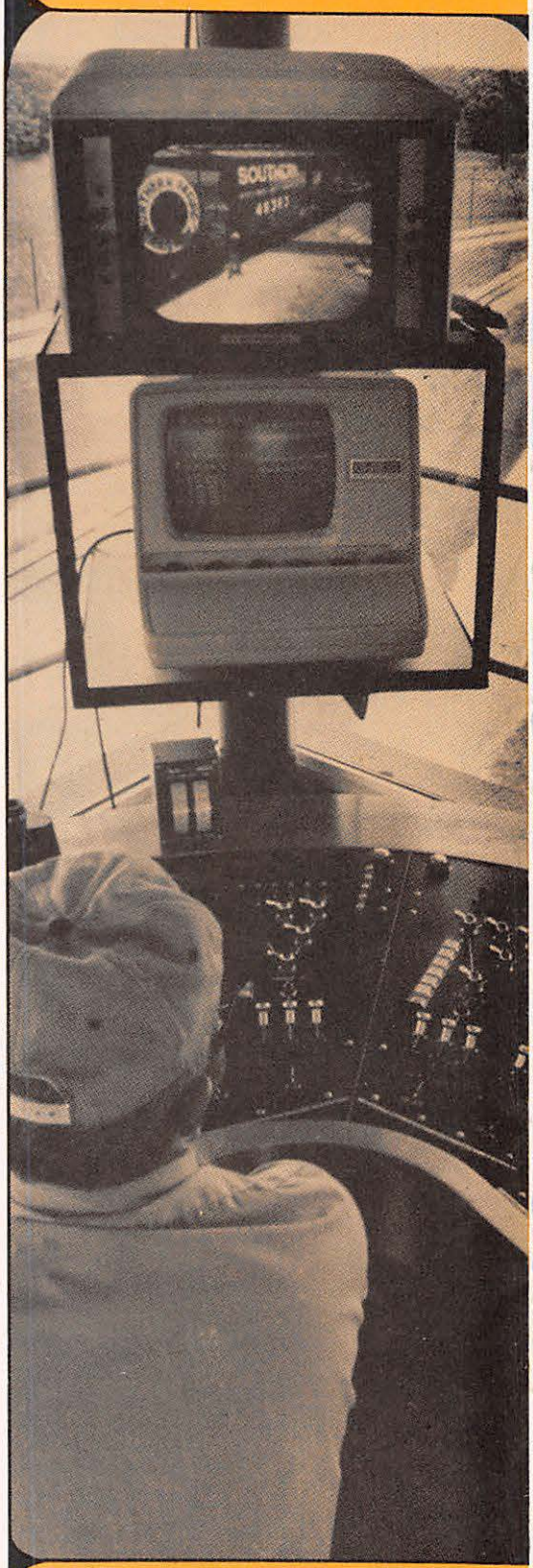
● **Control: How far?** First, consider process-control. Right now, this is something pretty much limited to hump-yard application. But, as Frisco's Phil Odom points out, "We can go at least as far as the dispatching of trains in ctc territory. In the control of various assets—locomotives and freight cars, for instance—railroads can go a lot farther than they have." Penn Central's Mike Sims calls process-control "a wide-open field—but one that to some extent may be a development down the road five to 10 years rather than in the next five years." He talks of the use of process-control logic in flat yards, and he makes this significant observation about the thrust of railroad computer development: "The industry for such a long time has had large, centralized computers and there have been relatively minor excursions into looking into process-control, which is a totally different area of computer application. What you're talking about is the distribution of computer power. And frankly, I don't think we can even conceive the potential."

Southern Pacific's Pete Germany is looking ahead to an aggressive development, "certainly in the physical movement of cars through terminals. This is now just in its infancy. Then, there are possibilities in train-control over the road, either through ctc or even through onboard systems using process-control. People in many parts of the world are looking at automation of ctc systems, and there's great importance attached to this. Some people are looking at the possibilities in train-control in which the dynamic movements in a train can be more carefully controlled. At this point, we seem to be pretty much unlimited as to what can be done in process-control."

Southern's Jack Jones agrees, and offers an example from Sheffield Yard: "The startling thing is that when you go there—where they're humping 1,800 or 1,900 cars a day—you find five people who are really making the yard run. We have a yardmaster, a hump conductor and three clerks—and much of what they do has to do with monitoring the operation. It's a fantastic operation to watch. And we're now working with this same concept to see what we can do in a flat yard. This is a tougher problem. You can't instrument, and there's not so much that happens more or less by the laws of nature. But we're looking at it. We're also working with small computers in dispatching—not to replace the dispatcher but to support him, so that he would be monitoring and selecting alternatives that the process-control computers present to him."

What's next? Well, Jones says, "Then you start to see, somewhere out in the dim future, that the process-control and

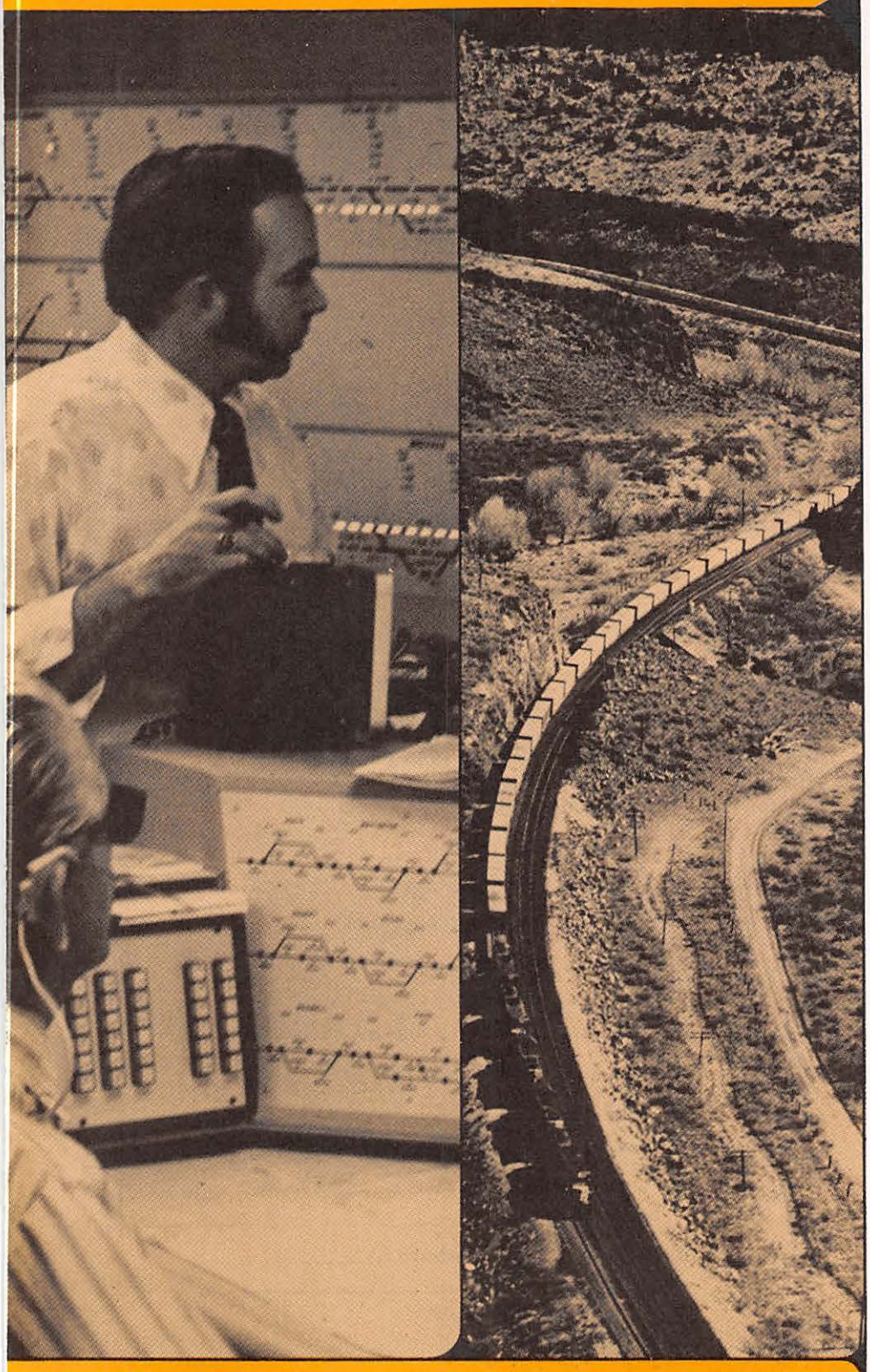
Process-control



In terminals...

comes next?

by computer....



For dispatching... *For train-dynamics control?*

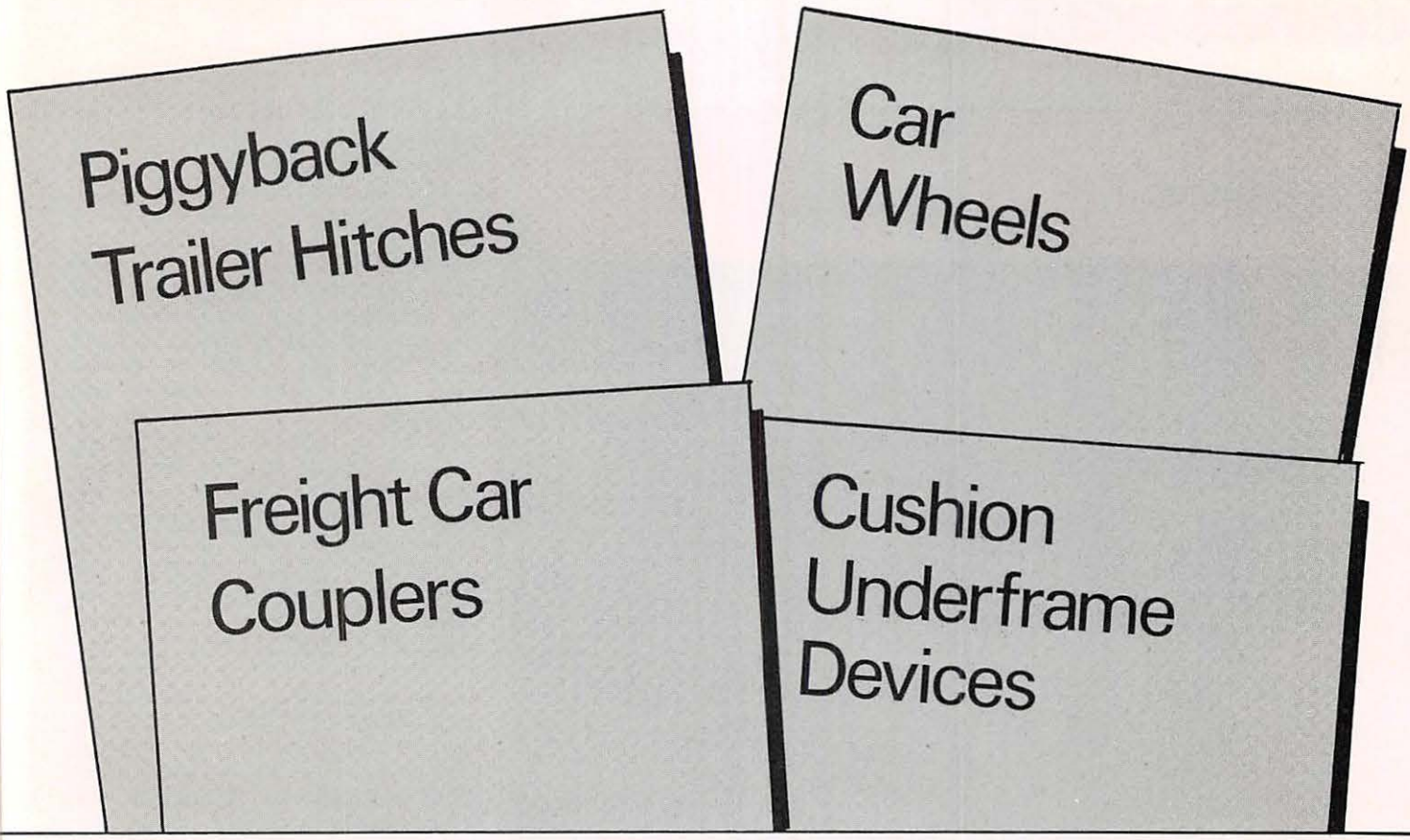
information computers involved in dispatching will be tied into the ones used in yard operations. And maybe you can be thinking about train control of one type or another. Now, all this isn't going to happen within the next five years. But it's going to happen, because computer technology is moving ahead so fast." How fast? Jack Jones reminisces: "We have five little computers at Sheffield. They cost $5,000 or $6,000 apiece. But I helped assemble and check-out the very first electronic computers in 1951. And the computers we were putting together that were worth $1 million in 1951 were not nearly so big and fast and powerful as the little ones we've got at Sheffield."

That whole matter of advancing technology gets emphasis from Bill Prinn at Chessie. Like the others, he sees a lot of potential in process-control both for yard operation and for train operation. Recent developments—developments in chip technology resulting in development of microprocessors—are reducing both the size of the installations required and their cost. "When you talk of distributing computer power," he notes, "developments like these will really help us do it. We've had economy of scale, with the big boxes at headquarters. Now, technology is giving us smaller and less expensive boxes, that can be put in the field."

● **Machine-to-machine.** Next, look at this matter of computers talking with computers. If line managers are ever concerned that systems people build systems for systems' sake, they should raise this computer/computer question—because they would find systems people pretty conservative.

SP's Germany, for example, regards computer/computer communication as something that's certainly technically feasible and, in fact, SP has computer/computer hookups to serve certain purposes. But, "unless this is actually required to solve a problem, it just becomes a 'nice thing to do.' If it can be used to avoid human interfaces or to avoid any need to physically move a piece of information from one place to another, then it may be highly desirable in many applications. One of the great benefits of computer/computer communication, of course, lies in the fact that you can transfer vast amounts of data in minimum time. But this also relates back to the original question: Do you need to transfer it in order to solve some problem? We have this kind of communication in some cases, but in others where we could have it we have elected not to because of cost."

Chessie's Prinn tends to agree: Direct computer communication might make



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The real potential is in putting computer capability out where people are running the railroad

information exchange a bit quicker and easier, but that basic capability already exists through other means. And he doesn't look upon direct hookups as "a major item in improving management or improving control of cars. At this point, this is not the kind of thing that will have significant impact in terms of helping to develop a better railroad operation."

PC's Sims also stresses the practical approach: "We could do a lot more than we do, computer/computer. The problem is, what do you do with all this data when you get it? There's no real technological problem, but there's still a real question as to how you provide operating people with enhanced capability once they get the information." Case in point: Penn Central has been talking with a major western connection about swapping data on cars on either road to be interchanged to the other, starting with waybill information and going on with updating of movement information. The problem, as Mike Sims sees it, is that even with all this computer-to-computer advance data it would still be difficult if not impossible to give the interchange point more than a few hours' notice of precisely what cars were headed at it on what train.

Frisco's Odom looks at a couple of other practical aspects. One, he believes, is that for operating purposes a direct railroad/railroad hookup might be best—but that for much other data exchange the best bet might be via a railroad/AAR/railroad interconnection in part for purposes of editing and summarization.

Southern's Jones, meanwhile, looks for a near-future increase in computer/computer communication—partly because of the benefit-potential in source-data-capture. One aspect involves repetitive waybill information: "It's got to be dumb," he insists, "that every shipment is treated as though it were a new shipment that never happened before—in the yard office in terms of billing, in the computer in terms of movement information, in accounting systems in terms of collections and audits. In fact, a very high percentage of shipments are repeats, and we're going to learn how to take advantage of this. We're studying this extensively now on Southern and we're proceeding to implement a plan in which waybills are keyed on devices hooked to the computer so that as the agent keys the bill the data can be captured by the computer."

Jones also thinks that it's not very efficient to have every road on an interline movement repeat what its predecessor did: "We originate a shipment in Atlanta and we give it to L&N at Louisville and they give it to C&NW at Chicago and they give it to Soo Line in Minnesota and they give it to CP in Canada—and the first any of them really may know about it is when the car and waybill appear, and they go to all the work of keying the information in and mistakes can be made and corrections have to be made and it's all a lot of work that might be unnecessary. Computers could pass that information along, all of us could start predicting with some accuracy when cars are going to arrive, and we could in effect start reserving space on trains for cars. And that would have great implications in terms of service reliability—in addition to cost advantages."

● **Who gains?** With the computer revolution moving on from the end of the beginning, the whole enterprise will benefit, hopefully—but who stands to reap the most direct benefits? Here, opinions vary just a bit—but the consensus is that operating managers rank first.

Frisco's Phil Odom puts it simply: Currently, the Frisco data base is the basis for something like 65% of the information from which the railroad is monitored and controlled and operating management "stands to gain the greatest over-all benefit from these data systems because of a couple of things. They're the largest users. They're by far the largest spenders of the monies taken in. Therefore, the potential for gain in that area has to be the greatest."

PC's Mike Sims, coping with the problems in the Northeast, takes perhaps a different total view. He looks at operating improvements on PC and on a number of other roads, but he also looks at a kind of over-all picture: "What we need to determine from the amounts of data we have is more about our business in terms of what we're actually doing, so that corporate, operating and commercial management can do planning that is more goal- or objective-oriented than tactical in nature. We need to be in a position to take the data and be able to extrapolate in such ways that would give us better three- and five- and seven-year plans. I feel that particularly in the Northeast we need to know better how to plan for an over-all service, first. And second, we need to know better how to be able to improve that service."

At Southern, Jack Jones sees benefits for all concerned—but, like Odom, he believes that "the biggest benefits, the most spectacular ones, will be to operating management." He reflects on this: "It's perhaps unkind but, I think, fair to say that operating managers have tended to lag behind in the real use of the computer. Nobody can blame them for this." In the commercial area, he points out, it often isn't all that disastrous if an error is made involving data retrieval and use in decision-making. By the same token, corporate-management's use of available data also goes back to the statistical—the historic kind of data—and while it's been most helpful in business and financial planning, it doesn't yet have the same connotations of immediate effects that operating management's use of computer-generated information does. "You've got to be very careful when you're responsible for operations," he notes, "and you move only when you're sure you're making an improvement. That's why perhaps it takes a little longer for operating people to understand and accept this kind of thing. In operations, it's a kind of cut-and-fit process—whereas in the accounting and commercial and corporate areas data-use lends itself more to experimenting and extracting and so forth. We have some rather spectacular things we can demonstrate that we've done in the operating area with the help of computers, but I think we've really only begun to scratch the surface. And we all have to remember that it's the operating end that really makes or breaks you."

At Chessie, Bill Prinn casts another vote for the operating department as principal beneficiary. The real potential, he believes, lies in "putting computer capability out there with the people who are actually running the railroad. That's the area where you stand to realize the real benefits from computer applications."

Southern Pacific's Pete Germany takes a broad look, pointing out that while railroads are working hard on developing realtime information to help control events as they're occurring, they're also accumulating a tremendous amount of historical data: "I look for a great deal more analytical processing of the historic information than we've had in the past. This will give management the opportunity to ask 'How could we have done better?' and then to project into the future. With the control systems in existence, management can control what's happening in a much tighter manner, and I really look for a tremendous increase in the use of historic information. Who will benefit? When you look at the management structure of railroads, I would think that for quite some time one of the major managerial areas involved in the use of computer information will be operating management. Perhaps ever-increasing in use

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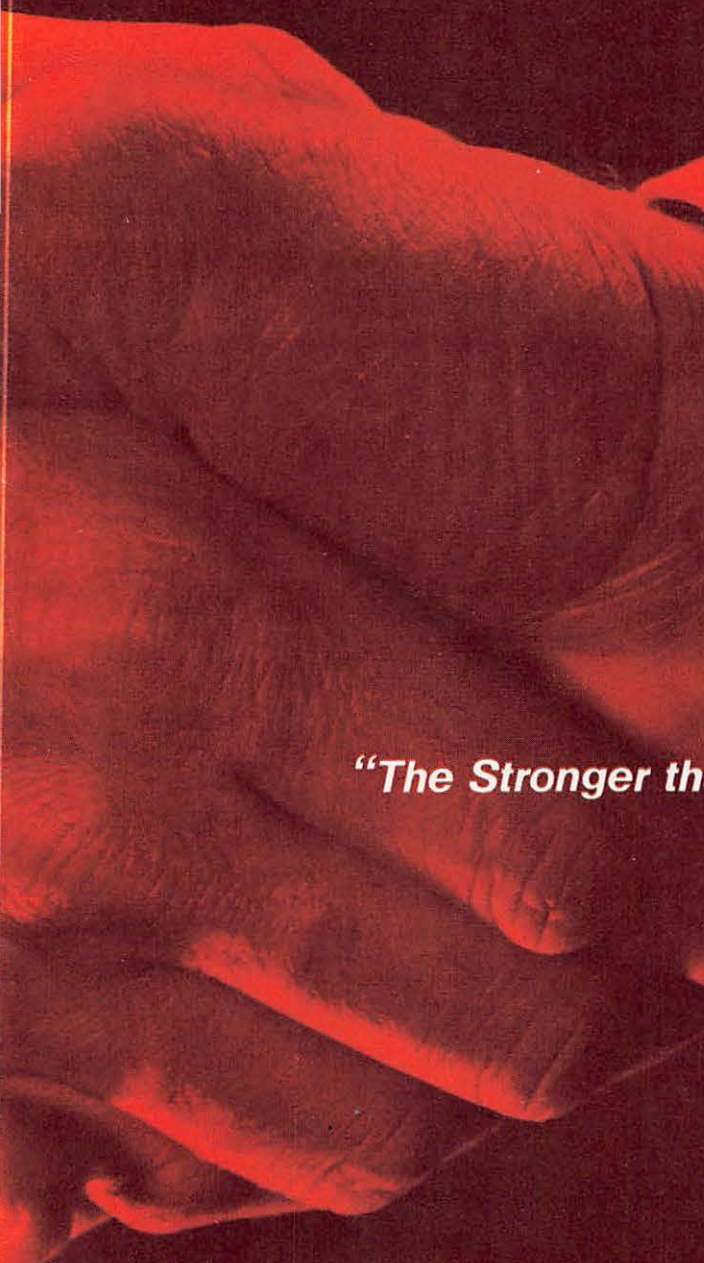

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Dollars going into computers are competing with things that may have higher priority

along with operating management will be management on the commercial side. Over-all, maybe corporate management will be the slowest to fully exploit the computer information that's available—but that is also an area in which we're moving along much faster now. Corporate management is looking at a lot of alternative decisions and doing much more evaluation based upon the historical information that's available in the computer along with information on current operations."

SP has some 300 active programs in its TOPS computer network, including analysis of train performance. According to R.D. Spence, vice president-operations, the next major effort will be scheduling of individual cars, dock-to-dock. After that will come car-cycle analysis.

● **Where it stands, and why.** Why hasn't railroad computerization gone farther than it has, given the fact that the electronic computer has been available for more than 20 years? Mike Sims gives one answer: You have to consider the position any given railroad is in with regard to the availability of research funds or risk money to be used for such purposes. Pete Germany gives a second: There have to be, on any property, budget considerations. Dollars going into computerization, he notes, "are competing with things that may have a higher priority—rail, ties, ballast, locomotives, cars and so forth. Our progress is not limited by the technological capability to do things. It's limited by the number of budget dollars that are available. There are a lot of things we would like to do in computerization now, but budget dollars have to go to higher-priority items. After all, you could have a perfect computer system, and with it you could run the railroad. But that wouldn't do much good if you didn't have the equipment to run it with or the structure to run it over."

In many cases, he notes, particularly in the case of information systems, "it's hard to pin down just what is the dollar value of a piece of information. It's the manager who's going to use that information, what he does with it, that produces the benefit. It's pretty much worth what he thinks it's worth, and that's hard to quantify in some cases."

Southern's Jack Jones chips in with this observation: For most of the time railroads have been working with computers they really have been going through a kind of beginning. There is the problem "which all railroads have to solve, and each railroad more or less has to solve it on its own, and that's the problem of how to capture data which are accurate and timely. That's no little problem. Training is involved, and understanding of what you're trying to do. Sometimes it takes years. After all, for 75 years or so, operating people have been told to move the traffic and keep it moving. And now, all of a sudden, people are telling them 'But be sure you report everything.' There are hundreds of places and thousands of people involved. At the outset, not all of the people are really sure they want this new thing to work. So you go through years of work in getting your data both accurate and timely. That, really, is what the railroads have been going through, and the problems are not all over now. Some of us, Southern included, achieved good levels of accuracy and timeliness some years ago, but some roads are just coming to this point now. And this is the thing that's been absorbing our efforts, because the failure to achieve it holds you back."

On an industry-wide basis, discussions like this inevitably lead into assessments of TRAIN I and forecasts regarding TRAIN II—and it's a mixed bag.

Jones, for instance, notes a lingering slowness in getting interchange-reporting in to the computer center—though, as he points out, there are mitigating circumstances such as those involving five-day and/or eight-hour stations and their reporting. Phil Odom comes down strong on the need for more policing, more control, more tightening-up in the TRAIN project "in order to make it do the job it's intended to do." He's concerned, as most railroad systems people are, that if it doesn't work, at some point government will step in—with some other form of system which quite likely would require more transmission cost, more transmission time, perhaps different formatting. With this in mind, he declares, "TRAIN II has to fly—and we've got to make it fly."

If, however, you sample the thinking of the systems people, you still find that a big concern—maybe the biggest—is the one involving the relationship between the man and the machine.

On the one hand, you have line management—really, the people for whom systems are developed. On the other hand, you have what Chessie's Bill Prinn calls "this big bunch of technology," surrounded by analysts and technicians who sometimes seem to speak a totally different language. In between, Prinn believes, is the area where the professional systems man can make a major contribution: "He understands computers and computer capability—but he also understands management and management techniques and problems. He can be the bridge."

SP's Germany thinks along similar lines: Not so many years ago, he recalls, the theory was that "you had to teach managers all about the computer. But it's been my view that computer people have to understand the management problem rather than getting management people to understand the computer problem. If you can get this understanding of what managers' problems really are, then system design will produce what management actually needs. A second point is that you have to make sure you have adequate communication, so that it's fully understood how the system is designed to be used. And of course you have to have sufficient flexibility so that you can change the system as management requirements change."

As for the educational process, back and forth, all roads are working on it, though perhaps in somewhat different ways. One approach on PC, for instance, is to develop systems with immediate, visible and provable benefits—such things as home routing and record rights systems and systems designed to be of direct aid to security people. Mike Sims concedes that it will take longer to get in the railroad industry the kind of compatible man/machine interface that now exists in, say, the insurance or banking industries. But he's also convinced the job can be done, and that it may best be done by demonstrating progress—demonstrating to line management that systems really can help.

Frisco's Phil Odom stresses the need for bringing line managers into the picture early in the development stages: "If you give managers the information they require to manage their part of the business, then the educational process tends to take care of itself. But if you develop a system in a capsule and then try to shove it down line management's throat, well, it's just not going to fly."

Southern's Jack Jones, among others, puts emphasis on the need for top-management support—and, so far as he's concerned, "our operating people are without equal in this area, in knowing what to do and how to do it, how to use the data as an aid in decision-making." On down the line, he believes, operating people "will gain confidence in the accuracy and timeliness of the data. Hopefully, they will gain confidence in the computer people and in the tools that are available."

So, back to the assessment made at the outset: In the "computer revolution," are railroads really at the end of the beginning? Let SP's Pete Germany respond: "I'd certainly have to agree with that." ■

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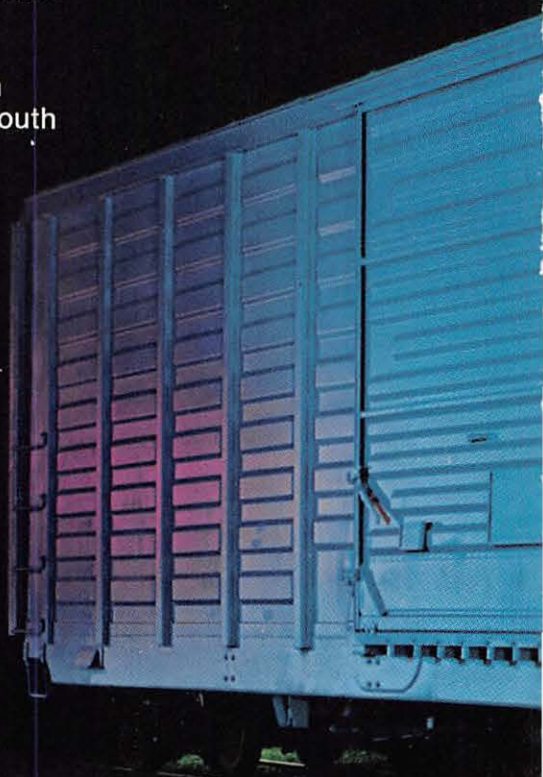

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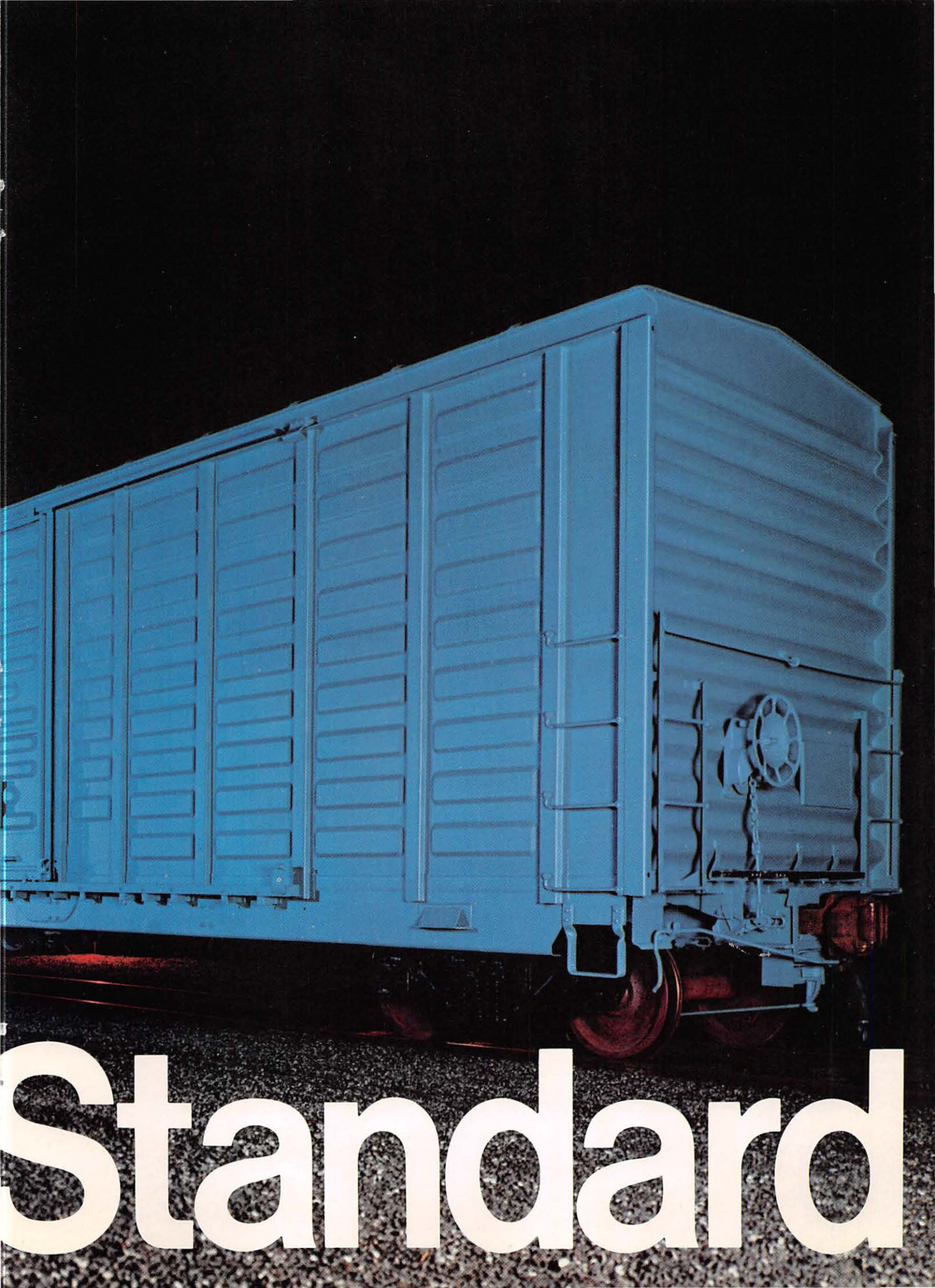

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Government will have major role in any U.S. mainline electrification

A substantial government role in planning, research and financial assistance to U.S. railroads for electrification of high-density freight and passenger lines is among the recommendations made in a recently released report of the Federal Railroad Administration. The report, "A Review of Factors Influencing Railroad Electrification," was prepared by a 27-member government/industry task force appointed in 1971.

Administrator John W. Ingram of FRA has commented on "the strong suggestion that government begin to move ahead in finding ways to help finance railroad electrification." The petroleum crisis should be a major incentive but, said Ingram, "it's tough to urge a railroad to put wires over its tracks when they are having trouble enough keeping the tracks themselves in safe operating condition."

Noting that the long-range efficiencies and economies of electrification are readily apparent for heavy-density mainlines, Ingram continued: "We want to find a way to get those wires strung up—a way to break off from the traditional reliance upon diesel fuel and a way to make effective use of the nation's electric generating plants during the night hours when so much of the freight moves anyway." He then speculated that "some sort of government support of rail electrification is in the not-too-distant future."

● **Continuing study.** Deputy FRA Administrator Henri F. Rush, Jr., recently said that FRA will continue to investigate electrification "as rapidly as the resources made available to us permit."

Recommendations of the task force were that:

—Electrification is the only available alternative to diesel-electric operations on high-density, long-haul lines;

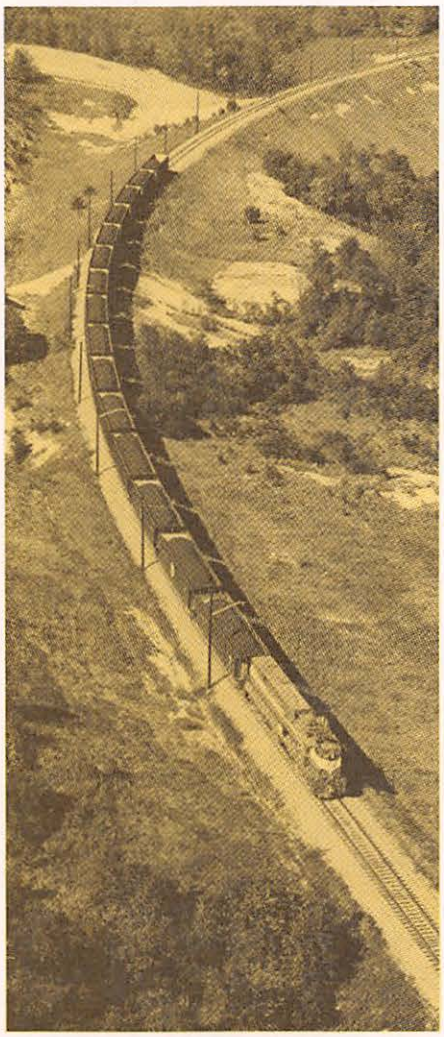
—Electrification offers the only feasible means to utilize coal or nuclear power for intercity movements of general freight and passengers;

—Rail electrification technology is available for immediate application;

—While electrification has been shown to produce a positive rate of return, it has not been done in America because of more pressing capital requirements;

—Electrification does present a number of as-yet-unresolved regulatory problems for railroads and utilities;

—Development of electrification in an orderly and effective manner can be facilitated by a joint government/industry program so that substantial improvements in national transportation efficiency can be achieved.



MUSKINGUM ELECTRIC introduced high-voltage alternating-current technology to U.S. railroad scene.

Fuel oil used by today's diesel locomotives represents less than 4% of the petroleum used in transportation and under 2% of all the petroleum consumed in the U.S. The task force noted that if as much as half the energy now provided by diesel fuel for rail operations were supplanted by coal or nuclear-fueled electric energy, it would save under 1% of total oil consumption.

While railroads have already experienced some supply difficulties and are paying higher prices for diesel fuel, "prospects for the availability of electric energy are more favorable than for diesel fuel because most electric power plants under development today are planned for coal or nuclear fuel. . .Adequate coal and nuclear fuel resources are available for several centuries."

The cost-effectiveness study conducted for the Task Force found a sensitiveness of railroad economics to fuel costs and the group explained that "two of the most compelling arguments for significant railroad electrification in the U.S. are the cost and availability of diesel fuel."

● **Solved many problems.** Electrification of freight lines in the U.S., all completed by 1940, came about as a means of improving operations over grades of more than 2%, as a way of increasing track capacity, or for overcoming smoke problems in tunnels. From a peak of over 2,500 route miles, electrified lines are now down to less than half that. The report does point out that "there are now over 100 miles of new electrified railroad operated by electric power companies." The Black Mesa & Lake Powell in Arizona (RA, Mar. 11, p. 9) and the Muskingum Electric in Ohio "incorporate some of the most modern electrified railroad subsystems available," although the two lines' relation to coal mining allows them "to enjoy certain economies not usually available with normal railroad operating parameters."

Since World War II, American railroads have not electrified, even though this was happening elsewhere in the world.

The Task Force listed several reasons:

—Standardized diesel-electric locomotives were economical to produce and to operate with inexpensive fuel that "appeared to come from an infinite supply."

—Investment in electrification may become subordinate to previous mortgages and creates such a long-term obligation that a railroad's credit standing and ability to obtain capital for other improvements is affected.

—Economic benefits of electrification occur over a long period while massive investment in a short period is necessary to set this process in motion.

—Long-term earning prospects for railroads have limited interest in investment and precluded the opportunity to take full advantage of tax incentives on capital investments.

The operating techniques for an electrified railroad differ from diesel-electric operation. There is some sacrifice in flexibility of motive-power utilization and there can be a new limit on overhead clearances that is not always overcome inexpensively. ■

Baltimore: Rail rapid to meet today's

By TOM KIZZIA

Somewhere, in some quiet node of American consciousness, exists Baltimore. When Americans picture the population centers of the Northeast Corridor, the big, rail-transit cities, most would think of Boston, New York, Philadelphia, and Washington. Yet Baltimore, too, is a charter member of Megalopolis, and as the seventh largest U.S. city, more populous than Boston or Washington, it has all the familiar problems. Plus one extra: Its transportation system depends solely on its streets. The Environmental Protection Agency called it "the Los Angeles of the East."

"Baltimore is an old 18th century city that developed like Philadelphia and the other eastern seaboard cities: a compact downtown with narrow streets," says Walter J. Addison, head of Maryland's Mass Transit Administration (MTA). "I don't know why Baltimore didn't put in a subway when the others did."

It is doing so at last. Much of the preliminary work is already complete, and if all goes reasonably well, groundbreaking for the first section of what planners gamely call Phase I will be this fall. Phase I will consist of two lines, one pointed northwest from the city and one pointed south, and presently they are expected to cost $1.127 billion. Altogether, a 28-mile mix of nearly equal portions of aerial, subway, and at-grade rail is due to open in 1981.

Four other high-traffic corridors in the city have been marked for some kind of future development by the Maryland Department of Transportation, which is responsible for the Baltimore rail project and already operates the city's buses. These corridors could end up with rail transit, as originally envisioned, or some rail/bus combination. The State DOT will begin studying these corridors about the time construction starts on Phase I.

For good reason, Baltimore's trains will be closely watched. It is one of the first American systems to be conceived and developed in what has been hailed as a new era for development of rapid transit systems: the post-BART age. On the other hand, the Nixon Administration has been cool to the high initial costs of such systems, and Transportation Secretary Claude S. Brinegar has said that with the exception of the few densest urban areas, cities should be looking at bus and other highway-oriented alternatives to rail when they seek to fortify their transit systems. The two attitudes converge in Baltimore.

● **Why rail?** What were Baltimore's reasons for choosing, late in 1970, to build a rail transit system?

The most important consideration, according to MTA's Addison, was that only rail would be able to handle the rush hour volume of traffic in the corridors. And, he adds, it could eventually prove to be cheaper than the alternatives.

"The man in my seat has to think about what it's going to be like in Baltimore 25 or 50 years from now, not just the next five. A bus transit operation is labor intensive: You're going to have high labor costs, daily and yearly, as long as you operate the system. For a rail transit system, though, once you've made a large initial investment it costs everyone less—in energy consumption as well as labor."

There were other reasons. Fixed routes would have an advantageous effect on Baltimore's demographic development; part of their function would be to irrigate strategic but thinly populated areas. At the center of this catchment would be the central business district, which is being remodeled earnestly. The $180-million Charles Center complex is almost finished, and beneath it the two transit lines will meet. Nearby, work has begun on the vast, 30-year Inner Harbor Project, whose first stage alone, including a World Trade Center put up by the Maryland DOT, will cost $269 million.

The auto traffic restrictions to be imposed on Baltimore in the next few years are going to be the toughest in the East. A rail transit system, Baltimore hopes, will be the most effective way to reduce downtown auto emissions. More buses, of course, might be a quicker if ultimately less helpful solution, but there is no indication that Baltimore has been tempted to divert funds from its rail plan to short-term solutions.

Baltimore considered other types of fixed-guideway systems, including the rubber tire Skybus concept, before deciding on conventional rail. "We didn't want to go with an unproven system," says Addison. "In Montreal, they've been having trouble with the rubber tires causing fires. Steel-on-steel can be made to run just as quietly as rubber tires; we will be making a special effort in our construction to keep noise down."

"Conventional rail's biggest problem is that it's been around so long. If it had just been invented it would be hailed as a great breakthrough," adds David Hammond. Once assistant general manager and chief engineer at BART, Hammond is now heading the Baltimore project for Daniel, Mann, Johnson, and Mendenhall/Kaiser Engineering, general consultants for the first section of Phase I.

Administrator Addison: *"For a rail transit system, once you've made the initial investment it costs everyone less—in energy consumption as well as labor."*

Hammond makes it clear that Baltimore won't go as far as BART did "on the frontiers of technology," but he says "BART's quantum leap makes our lesser jump more certain."

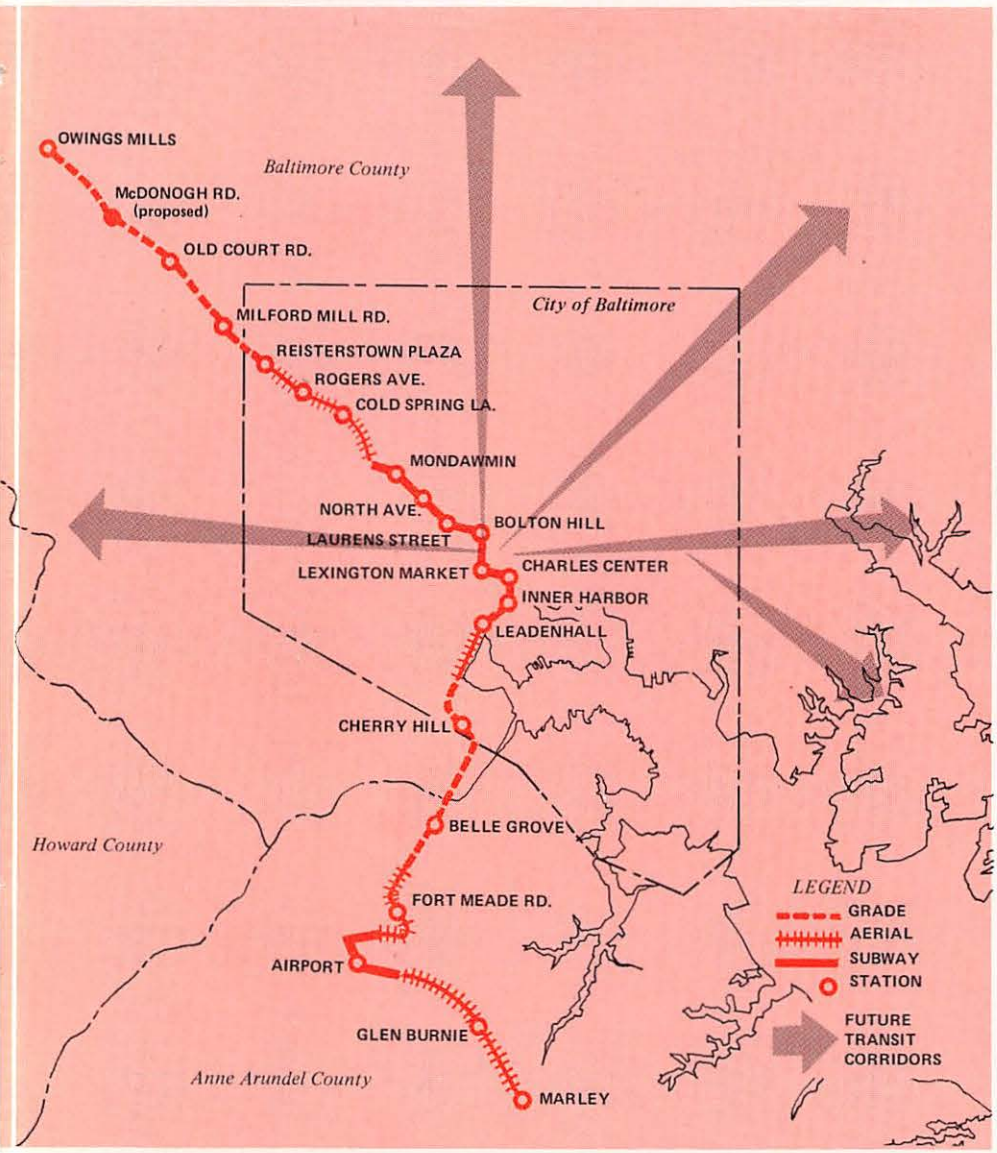
● **Learning from BART.** "We learned from BART that what matters in the end is not technology per se from the lab, but from the factory. We should have been more definitive about production requirements, and not quite as concerned with technical performance.

"Another thing I think we learned is that you have to strike a reasonable balance of interests and then get to work. Groups are going to have opposing interests, and you have to recognize when planning a system that you won't be able to please everyone. Too much flexibility can be a downfall."

Some 18 months before its system opens, Baltimore will have put the whole thing together for testing, prototype cars and all, on a short stretch of track which will eventually be incorporated into the final system. Hammond would also like to see a permanent test track installed in the repair yards so that in the future cars can be tested without putting them into revenue service.

The system will be equipped with Automatic Train Operation and Control, but just how far Baltimore will carry computer regulation is still undecided. Baltimore will need 160 cars for its Phase I operation. Similar in general configuration to the Washington Metro cars, they will be put out for bid in about two years.

problems – and tomorrow's



Consultant Hammond: *"Conventional rail's biggest problem is that it's been around so long. If it had just been invented it would be hailed as a great breakthrough."*

Frank Hearne, director of MTA's Rapid Transit Development Division, was assistant chief engineer at BART. He points out that many of BART's problems with its train control came from trying to mesh three distinct lines into one operation. Baltimore's two lines will remain separate, and passengers will cross between them at the Charles Center Station.

There are other differences between what BART did ten years ago and what Baltimore is now attempting. "I would say what we have in mind is really more comparable to the systems of Toronto and Montreal than to BART," says Addison. "We'll be going out to the suburbs, but not to the extent BART or the Washington Metro have. Still, it's worth noting that suburban extensions are the least expensive part of your system, and are worth a lot of extra passengers."

Also as in Toronto and Montreal, Baltimore's system has the advantage of being under a single political jurisdiction, responsible as well for other modes of transportation. And, Addison suggests, the public is more willing to pay the cost of a rail transit system than it was even five years ago.

Public reaction has been good, if slightly skeptical. "They have a 'believe it when I see it' attitude," Addison says. Public hearings on route location are being held one section at at time; there will be four sections of Phase I, all to open simultaneously in 1981.

Here's what the public is hearing:

Section A, the farthest along in planning, presents the toughest engineering problems, as it runs through the center of Baltimore from Inner Harbor northwest to the city limits. It will be underground for some 5½ miles downtown, and as the population begins to thin, it will debouch and follow 3 miles of aerial structure. Final design contracts are being put together, and groundbreaking is planned for the fall.

The second section will be the "Northwest Corridor." From Reisterstown Plaza (Section A's last stop) the rail would return to grade for 5.9 miles up the median of a proposed expressway. Hearings were held here last spring, and a variety of objections raised: the route lies in a flood plain; it impinges on Sudbrooke Park, recently named a National Historic site; some locals didn't want to see another highway built, no matter what it had running up its median. The State DOT is studying proposed changes.

Late this spring public hearings are scheduled for the southern end of Phase I, running from the Anne Arundel County line south to the town of Marley. This 9-mile section contains the only subway that isn't downtown, 3 miles beneath Baltimore-Washington International Airport. MTA plans to elevate the rest of this section, above the unused Baltimore & Annapolis railroad right of way north of the airport, and alongside that of the Western Maryland south of the airport.

That leaves the link between downtown and Anne Arundel County. All three types of construction will be used on this final section.

One third of the system will be elevated. "We didn't want an enclosed right of way running through our communities like a Chinese Wall," says Addison.

● **"A manageable objective."** "We wanted a manageable objective, which

we would be able to accomplish in a reasonable time," he explains. "We're not out to solve all the city's problems at once. Like Montreal, we'll let the line prove itself and then add to it on an incremental basis."

Back in 1968, when Governor Spiro T. Agnew endorsed a report recommending Skybus, planners were projecting a 71-mile system ready by 1979, all for $1.7 billion. First estimates in 1971 for a 28-mile conventional system were $656 million. Now that's almost doubled.

MTA officials seem confident they can maintain the local share of the swelling costs. The Maryland DOT has charge of the project, and its desegregated budget, unique among states, gives it freedom to balance funding among different modes. All transportation money for the state comes out of a single pool, filled mostly with revenues from a 2-cent-per-gallon gasoline tax. The State DOT is already footing the bill from this fund for the operating deficit run up this year by MTA's buses, over $6 million.

No one is sure what will happen to the Federal funds they've counted on from the start. The Nixon Administration's recent proposal for mass transit, now facing Congress, would provide the Secretary of Transportation with $700 million in discretionary funds, to be used for major capital projects only. Baltimore has received $22 million so far from UMTA under the present system, for final engineering on Section A. An application for an additional $95 million is now before UMTA. This would cover additional engineering, purchase of rights of way, relocation of utilities, and some construction. Baltimore received "preliminary approval" for this money some time ago.

"An IOU is better than denial of any interest at all," Hammond says. "We're proceeding on the assumption that the 80% grants will continue to be made."

But MTA officials are clearly concerned. "Even if no cities ask for capital grants from the President's proposal except the few who are already committed to building programs, there may not be enough money set aside for capital grants to go around," Addison says. "And it looks like a year-to-year decision. I've seen no evidence of any long-term commitments."

Will DOT's efforts to discourage the building of fixed-rail systems impose any restraints on the two cities—Baltimore and Atlanta—which are far advanced in planning such systems? Most observers think not. DOT is apparently resigned, if not reconciled, to the idea that planning has gone too far in these cities for any real retrenchment, and any efforts to favor busways over urban railways are likely to be concentrated in those cities which are still modally uncommitted. ■

Which U.S. cities need rail

Major questions involving the future of urban transportation are being hotly debated in Washington.

On one side is the Nixon Administration, which wants to (1) scrap present transit funding programs in favor of its UTAP plan which it claims will add $11.6 billion in "new money" over the next six years; (2) offer transit operating subsidies on a strictly population basis; and (3) promote wider use of buses and discourage the planning of any additional rail transit systems.

On the other side are most of the transit planners and operators. They argue that (1) UTAP—Unified Transportation Assistance Program—while well-intentioned, would really provide less money for major transit projects than is now available; (2) that population-formula operating subsidies will put most of the money in cities where it is least needed; and (3) that while buses are clearly the answer for most urban areas, it is short-sighted to base any anti-rail campaign on existing population densities.

DOT Secretary Brinegar: *"Cities which do not have rail transit systems should carefully consider all the alternatives prior to starting new systems . . ."*

● **Rail vs bus.** It is the solidifying opposition within the Department of Transportation to rail transit that is causing consternation among advocates of fixed-guideways. And they are giving careful study to two major—and nearly identical—recent pronouncements of DOT Secretary Claude S. Brinegar on this touchy and controversial subject.

The first of these was Brinegar's March 5 testimony before the House Appropriations Subcommittee on Transportation on the whole subject of national transportation policy. This is what he had to say in the segment entitled "Urban Transportation":

"Our analyses, as well as our experience in administering the Urban Mass Transportation grant program (from which $3 billion has been given since 1970 to over 150 cities to buy buses and help build or improve rail systems) offer these guidelines:

"1. It is extremely important to recognize that each urban area is different. No standardized solution is possible. An approach tailored to each individual case is called for.

"2. The major obstacles to improving urban transportation are: (a) the lack of comprehensive local planning broad enough to embrace the entire spectrum of urban issues; (b) the lack of a public decision-making mechanism to resolve them; and (c) the lack of comprehensive management of the public transportation system of each urban area.

"3. Except for our largest cities, the urban transportation problem is principally one of peak-hour capacity. During most of the day, the streets and particularly the transit systems are significantly underutilized. Less than 25% of the available transit seat miles are actually in use.

"4. Large cities with high-density cores face the most serious transportation problems. As a result of this high density and its accompanying congestion, the cost of constructing and operating transportation facilities in these city cores is significantly higher than in other areas.

"5. Cities that do not have rail transit systems should carefully consider all alternatives prior to starting new systems. The solution for most cities is more in the direction of traffic management, special bus systems, incentives for car pools, and peak-hour stretch-outs.

"6. Improved public transit can attract a great many new riders, yet the automobile will likely remain the dominant form of transportation for all but the largest cities for a long time. We should recognize this and move to do all we can to make sure that the automobile is energy-efficient and non-polluting and that its role in the city is effectively managed."

On March 17, appearing before an energy conservation conference in Washington, Brinegar reiterated this statement almost verbatim—with one notable change. Where he had said on March 5 that "improved public transit can attract a great many new riders," he changed this to "improved public transit—especially bus transit." And with his March 17 statement, he submitted a table listing the 25 largest urban areas, citing total population and population density. Of these, six now have rail systems; three more are building them.

transit? Brinegar hedges

URBANIZED AREAS OF THE UNITED STATES WITH POPULATIONS OVER 1,000,000 (1970)

Area	Population (Million)	Density (1,000 people per sq. mile) Total	Central City	Fixed Rail System?
New York-New Jersey	16.2	6.6	26.3	Yes
Los Angeles-Long Beach	8.4	5.3	7.0	No
Chicago-NW Indiana	6.7	5.3	15.2	Yes
Philadelphia-New Jersey	4.0	5.4	15.2	Yes
Detroit	4.0	4.6	11.0	No
San Francisco-Oakland	3.0	4.0	11.0	Yes
Boston	2.7	4.0	13.9	Yes
Washington-Md-Va	2.5	5.0	12.3	Under const.
Cleveland	2.0	3.0	9.9	Yes
St. Louis	1.9	4.1	10.2	No
Pittsburgh	1.8	3.1	9.4	No
Minneapolis-St. Paul	1.7	2.4	7.1	No
Houston	1.7	3.1	3.8	No
Baltimore	1.6	5.1	11.6	Under const.
Dallas	1.3	2.1	3.3	No
Milwaukee	1.3	2.7	8.0	No
Seattle-Everett	1.2	3.0	6.4	No
Miami	1.2	4.7	9.8	No
San Diego	1.2	3.1	3.6	No
Atlanta	1.2	2.7	3.9	Under const.
Cincinnati-Kentucky	1.1	3.3	5.9	No
Kansas City	1.1	2.2	3.9	No
Buffalo	1.1	5.1	11.2	No
Denver	1.0	3.6	7.6	No
San Jose	1.0	3.3	3.7	No

Source: DOT

The inference which many thought was intended to be drawn from this listing was that those cities which do not presently have or are not presently building rail do not have sufficient density to require rail systems.

● **"Where would New York be. . .?"** Replying obliquely to this argument, Dr. William J. Ronan, chairman of New York's Metropolitan Transportation Authority and president of the Institute for Rapid Transit, posed a rhetorical question: "Had we waited for density to materialize before building our rapid transit system in New York, where would we be? The development of New York City, or of Boston, or to take a more recent example, of Toronto, reflects a planning decision to proceed with urban transportation investment in order to shape development. . . .

"I am certain that many public transit projects now successfully in operation, including those in New York City, could not have met the initial thresholds some now set forth as minimal for rail transit."

● **Needed: $2.5 billion a year.** On the questions of capital and operating assistance, Ronan replied more directly to the Administration's positions.

While applauding the general thrust of the UTAP proposal, Ronan contended that it would fall far short of meeting the needs for major projects. "In our judgment," he told the Transportation Subcommittee of the House Committee on Public Works March 20, "the funds received for capital needs should be increased substantially to ensure that the nation builds an adequate mass transit system—including rebuilding some of those now more than 70 years old. The $700 million per year in the UTAP proposal—the so-called UMTA 'discretionary fund'—is not enough for this purpose. And the total, looking ahead for optional highway, transit capital, and transit operating assistance of $2 billion per year will hardly be sufficient to meet the combined needs indicated.

"During the next five years, based on well developed local plans and programs, we estimate $2.5 billion a year is needed from the Federal government to meet major transit capital needs."

MTA's Ronan: *"Had we waited for density to materialize before building our rapid transit system in New York, where would we be . . .?"*

As for operating aid, Ronan reiterated in the same testimony the transit industry's opposition to the Administration's population-distribution plan. Transit men, he said, feel strongly that ridership and revenue vehicle miles must be important factors in any such formula (as they are in the so-called Minish-Williams Bill which the Administration says it would veto).

Ronan noted that Secretary Brinegar had attacked the Minish-Williams formula "because it would, in essence, put more of the money where the need is—in the big urban centers that carry millions of passengers daily. [Brinegar] pointed out that under such a proposal New York City would receive 20.8% while Phoenix, Arizona, would receive only .04%.

"It is difficult to see," observed Ronan, "how the .04% would be unfair to Phoenix as this could have given that fair city $1,680,000 annually or 90.7 cents per rider, when if my memory serves me, the fare in Phoenix is 35 cents—the same as on New York's subways and buses. Apparently, the Secretary of Transportation thinks it is unfair to Phoenix to give that city only 90.7 cents or ten times as much per passenger as New York which would get 9.3 cents per passenger. Under the UTAP proposal, I am told, the one which Secretary Brinegar says is fair, the Phoenix figure would be $1.44 per passenger mile while New York would get 3.7 cents per passenger."

The hearings are continuing. ■

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the problem stoppers

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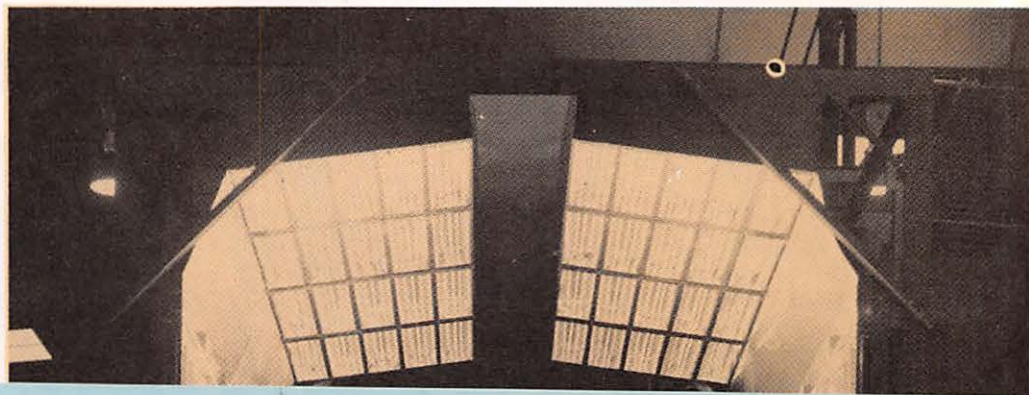
Coatings: A $30 million market —and still growing

By ROBERT D. BARTLEY
Associate Editor



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freight car paint ranged from $2 a gallon up to around $15 a gallon for the more durable polyurethane coating. There is nothing on the market today for less than $3 a gallon, one railroad reported, and the chances of the price of the lower-cost alkyd coatings going to $3.50 a gallon are, unfortunately, very good. Meanwhile, an $18-20 price tag on some of the high-grade coatings is already being seen.

The recent lifting of certain Phase IV price restrictions and the ending of the this month will surely add to the cost woes of purchasers of coatings. Some manufacturers are reporting that their raw materials costs have soared as much as 40% since the beginning of the oil shortage. While they have been able to cover a portion of these added costs with price increases that stayed within the Federal guidelines, they say they haven't come close to breaking even. Thus, further price increases this year seem inevitable.

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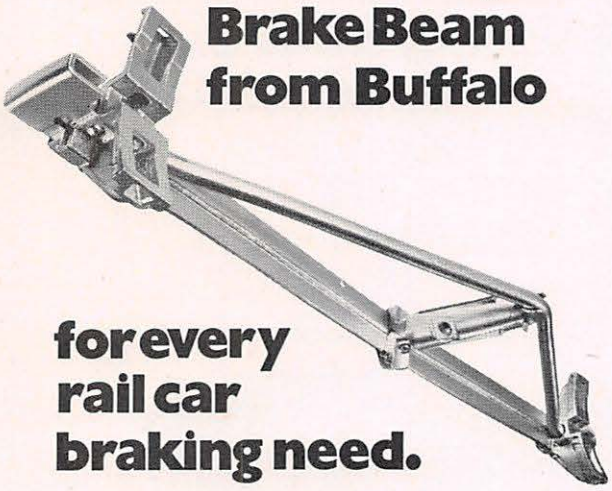
● **New cars—big market.** Coatings for

There's a Brawny Brake Beam from Buffalo



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Coatings: A $30 million market —and still growing

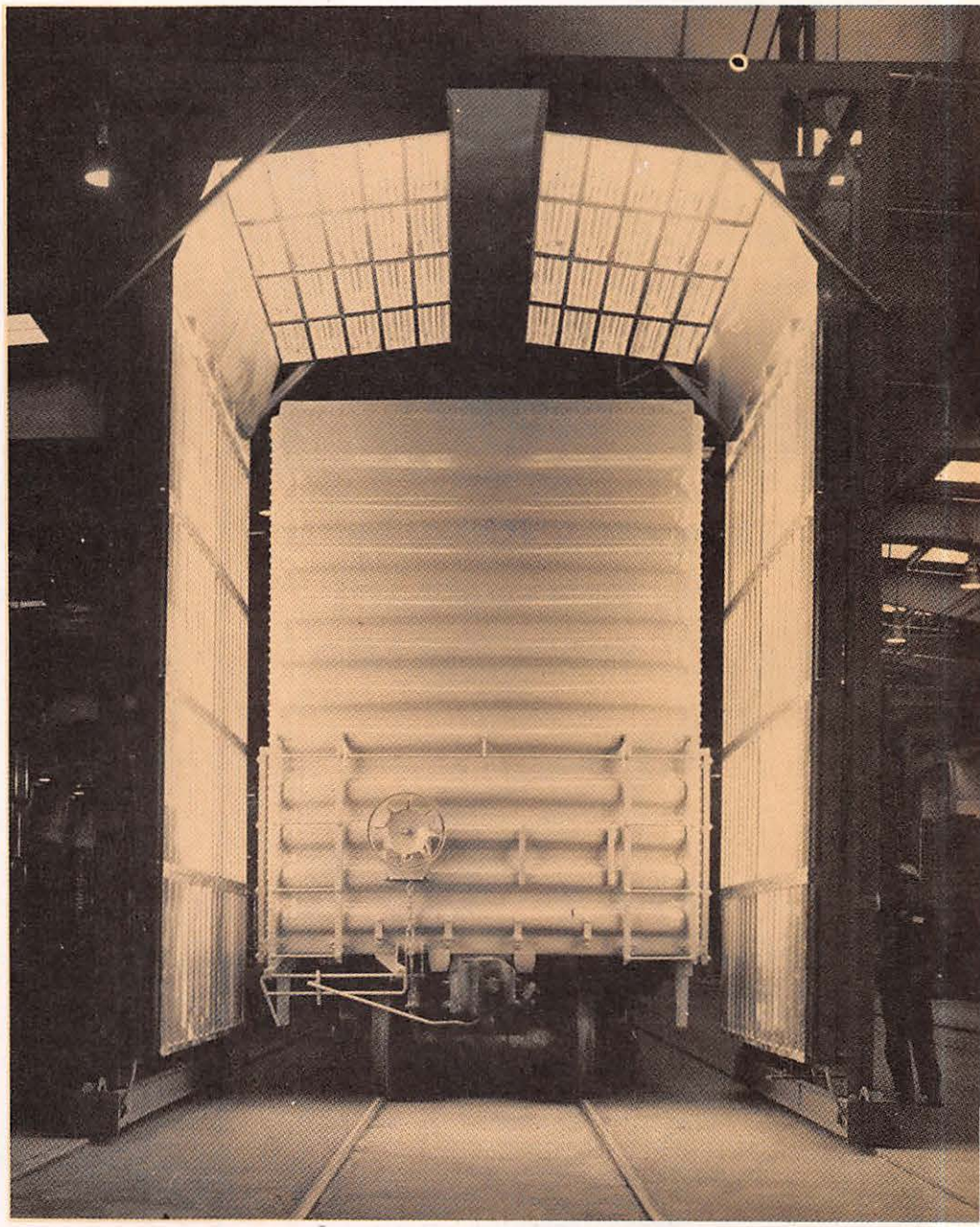
By ROBERT D. BARTLEY
Associate Editor

In the era when Henry Ford was telling his customers that they could have the Model T in any color they wanted so long as they chose black, the nation's railroads weren't faring much better with their selections of colors for freight cars. Like the Ford customers, they could pick basic black. If they didn't like that, they could select maybe one other—a rather drab color, a rusty brown which somehow or other earned the name "box car red."

The net result was that when black steam-powered locomotives were stuck on the front ends of these strings of black and brown freight cars, every train traversing the national rail network looked as though it was on its way to a funeral.

But, like the women of today, the trains of today have come a long way. Just about every color of the rainbow is used now for rolling stock coatings. Furthermore, the quality of today's coatings is far superior to that of 50 years ago, or even 15 years ago, and the colors are more resistant to fading.

The railroads represent about a $25-30 million annual market for the coatings industry. It is a relatively small part of the $3.15-billion national coatings market, but it is a segment that is growing. Until recently, coatings represented one of the least worrisome of supply problems for the railroads and rolling stock manufacturers. Paint of all kinds was almost as plentiful as water for the water bottles in locomotives. However, coatings manufacturers have fallen victim to the oil shortage, as have many other industries, and many of the petroleum derivatives used to make paint have become difficult to keep in stock. Pigments, resins and solvents are all in short supply, one major manufacturer reported.



DRYING AND CURING of today's coatings are simplified with large booths.

● **Costs are soaring.** Accompanying this shortage of coatings components is an increase in cost. Last year, the price of freight car paint ranged from $2 a gallon up to around $15 a gallon for the more durable polyurethane coating. There is nothing on the market today for less than $3 a gallon, one railroad reported, and the chances of the price of the lower-cost alkyd coatings going to $3.50 a gallon are, unfortunately, very good. Meanwhile, an $18-20 price tag on some of the high-grade coatings is already being seen.

The recent lifting of certain Phase IV price restrictions and the ending of the price controls altogether at the end of this month will surely add to the cost woes of purchasers of coatings. Some manufacturers are reporting that their raw materials costs have soared as much as 40% since the beginning of the oil shortage. While they have been able to cover a portion of these added costs with price increases that stayed within the Federal guidelines, they say they haven't come close to breaking even. Thus, further price increases this year seem inevitable.

Railroads may not find it to their liking, but they'll learn to cope somehow with the price increases. What they may find very troublesome to live with, however, will be a severe shortage of coatings, if one develops. Reported a veteran purchasing agent with a major carbuilder: "I've been in this business for a long, long time, and this is the first time I've ever encountered a paint shortage. Our supplies are running very tight, and on a couple of occasions, our shops were on a day-to-day basis so far as paint supplies were concerned."

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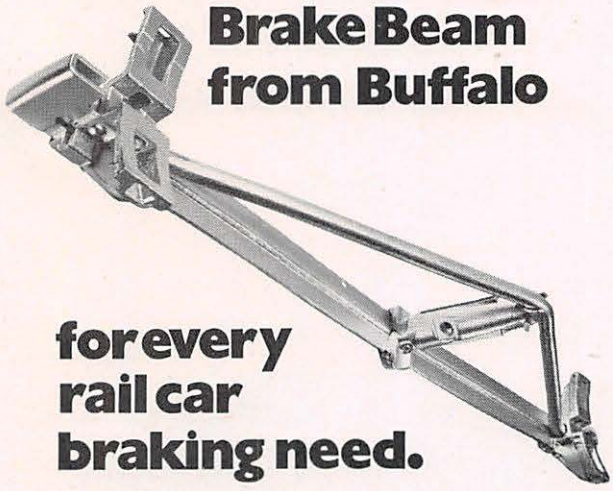

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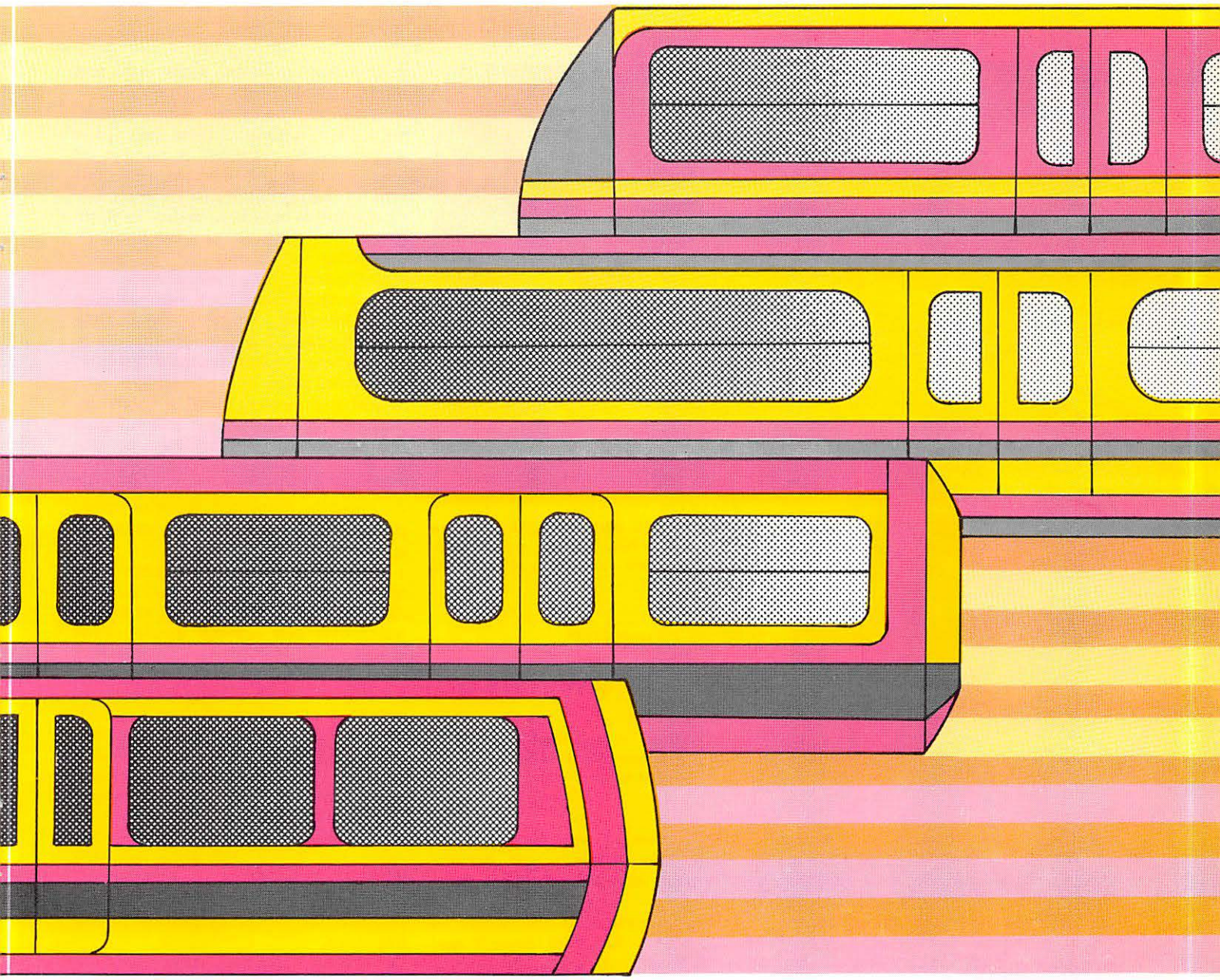

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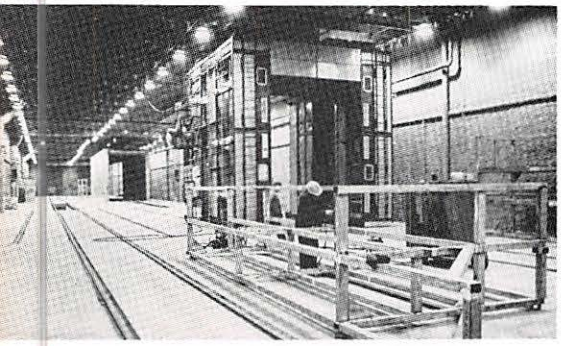

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BN is opening $1 million paint shop

SIX STATIONS in the 456-foot structure will paint a dozen cars daily with the railroad's green paint scheme.

new freight cars represent about one-half of the total railroad market. It takes a whale of a lot of paint—millions of gallons—to coat all the new freight cars produced each year. As an indication of the tremendous amount that is required, a 50-foot box car takes, on the average, about 11 gallons of primer and 15 gallons of finish coat. It would take another 10 gallons over and above that amount for a 60-foot box car.

The covered hopper car requires an even greater amount of paint. An average 4,600-to-4,700-cubic-foot covered hopper requires approximately 21 gallons of primer and 23 gallons of finish. If it will be in the type of service where an interior coating is required, another 26 gallons of special lining material will be used.

If all carbuilders and railroad car shops should produce new cars at full tilt this year, they will probably use as much paint as would be required to coat more than half a million houses. Thus, as can be seen, new freight cars represent a sizable market for paint manufacturers. When this business is combined with that of coating locomotives and re-coating existing rolling stock, railroads become a major sales target of the coatings industry. With the carbuilders and locomotive manufacturers operating at peak capacity this year—while automobile production and housing starts are down—the railroads may become very popular in the eyes of the paint companies.

Strangely enough, if the supply of key ingredients for paint doesn't ease soon, railroads may be forced to drift back to the days of black and rusty brown freight trains. Except for the pigments used in black and "box car red" coatings, there is a growing shortage of those that have given freight trains some class. Red, for one, is becoming increasingly difficult to keep in stock, and the other bright colors—yellow, orange, green, blue —which make some freight trains look as though they may have been patterned after a string of Mardi Gras beads, are tougher to get.

In all likelihood, shortages of paint components won't last for a long time, and such things as the attractive red-white-and-blue Bangor & Aroostook box cars and the snazzy multi-hued covered hoppers which Pullman Transport Leasing has been putting on the rails in the past few years won't become endangered species. Railroads and paint manufacturers have been cooperating on a number of projects which may ultimately lead to the development of coatings which will not only have better color-holding qualities but which also protect surfaces better, apply easier and meet tough air quality standards.

● **Water-base paint will work.** Capturing a lot of attention these days is the water-reducible coating. A number of tests have been conducted with this type of coating in the past six years, but most of them have been merely exploratory. Now, however, as a result of the shortening of supply of petroleum hydrocarbons used as solvents, the water-reducible coating is being studied more intensely. Southern Pacific, for example, has 20 freight cars in service with exteriors painted with a water-reducible red paint.

Although water-reducible paints are now priced about $1 per gallon higher than oil base paints, they have definite cost-saving features that show up in application and in extended service life. As might be suspected, water-reducible paints have properties which cause less air pollution.

Through its Protective Coatings Committee, the Car Department Officers Association has perhaps kept as close a watch over new coatings developments as anyone in the railroad industry. The committee reported at last year's CDOA meeting that cars bearing five-year-old water-reducible alkyd coatings had been inspected and the coatings were "still considered to be satisfactory for both protection and appearance." The committee conceded that shop operations favor solvent-based materials, especially at repair tracks and in cold weather areas, but it felt that water-reducible coatings had features which would make them more and more important to railroads for future application to rolling stock.

● **Tank car shielding tested.** Another coating that has come under intense investigation in the past few years is thermal shield coating for tank cars. The Association of American Railroad's Research & Test Department, in cooperation with the Railway Progress Institute and the Federal Railroad Administration, has been studying thermal shield materials in hopes of discovering one which will prevent the temperature of steel from rising above 800 degrees F. in a given time period. While thermal shield coatings would not prevent fires in the event of a tank car derailment, they may be able to prevent violent tank ruptures and the propelling of the tank car fragments beyond the derailment scene. Rather elaborate tests have been made using one-fifth-scale cars as well as full-size 30,000-gallon LPG tank cars coated with various types of protective coatings.

Powder coatings, currently under extensive research for future railroad application appear to offer great promise, although they certainly can't be regarded as near-term solutions. A major

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hurdle which must be surmounted before such a coating system becomes practical is the necessity to pre-heat surfaces to somewhere in the area of 300-400 degrees.

Perhaps a little closer to being introduced in practical form is a coating for the interiors of open top hopper cars that will be used in hauling high-sulphur coal. At least one major supplier of coatings to the railroad industry is working on the development of the type of lining material which will, first of all, protect the car body from corrosion, and secondly, resist the abrasiveness of ladings such as coal. Such a coating could be on the market in less than a year.

Considerable progress has been made in recent years in developing new and better coatings for locomotives. Polyurethane coatings for these members of the railroad rolling stock family have been introduced within the past five years and they are capable of lasting 8-9 years, equal to about half the lifetime of the locomotive itself. This is more than double the expected mortality of the coatings formerly used for motive power units. These polyurethane coatings are somewhat more difficult to apply than acrylic lacquers, reports one locomotive manufacturer, and they tend to make scheduling of the painting process more troublesome. But all this is more than offset by the far higher quality of the finish they produce.

● **But clean the surfaces first.** Meanwhile, as the search continues for new and better coatings for freight cars and locomotives, coatings manufacturers and the railroads themselves are still preaching the sermon that a coating, no matter how expensive it may be, is no better than the surface over which it is spread. No coating applied over mill scale, shop grease, dirt or other undesirable materials is going to be durable. A coating that relies on a mechanical bond between itself and the surface to be covered must be assured that the surface's metal profile is of the proper depth, otherwise it will not properly adhere.

Various commercially-produced alkaline or acid solutions are used by the railroad industry and rolling stock manufacturers to prepare surfaces for painting. Many larger shops also employ sand-blasting or shot-blasting to assure absolutely clean surfaces before the coating is actually applied.

● **New facilities nearing completion.** Several roads have built new paint shops in recent years or have made extensive improvements to existing facilities. Two new shops—CP Rail's Ogden Shops, at Calgary, and Burlington Northern's at Havelock, Neb.—are due to open this year. The BN facility, a 56-foot-by-456-foot structure able to process 16 cars a day, is scheduled to open June 1. The $1.1-million shop features a half-dozen stations in which modern cleaning and painting machinery and drying equipment have been installed.

BN shop designers made certain that the facility and the equipment in it are complying with all local and national safety codes and standards. Twelve of the 16 cars handled each day will be painted—with BN's distinctive green—in a DeVilbiss traveling paint spray booth that moves along the car at the rate of 16 feet per minute. Another feature of the shop is its 70-foot drying oven, which will bake the freshly-painted cars at 225 degrees for 20 minutes.

For the present, BN is planning to continue to manually paint four cars each day. However, since the two tracks in the building are on 25-foot centers, there is sufficient space to permit installation of a second paint spray booth. A new 610-foot transfer table has been installed to serve the new paint facility as well as other buildings in the Havelock shop complex. Under consideration for installation later is a track scale at the outbound end of the new paint shop.

The CP Rail Ogden Shops' new paint facility, scheduled to open late this year, cost $1.5 million. Designed to handle all types of freight cars as well as

OPEN THE LINE FAST!

locomotives, it features five operational stages arranged for assembly line production. The stages include a drying oven to raise the vehicle's temperature to a level that is best for paint adherence, a shot-blasting unit, a spray booth, drying oven and stencil booth.

The new shop, which will handle 12 cars a day or 2,700 cars a year, will join another new CP Rail paint facility that was opened in 1972 at Winnipeg's Weston Shops.

● **OSHA standards are factors.** In the U.S., special care must be taken in designing and equipping cleaning and painting facilities because they must meet standards established by the Occupational Safety and Health Administration or other state and local regulatory agencies. And the Environmental Protection Agency has established rules governing the amount of pollutants which may be emitted into the air by an industrial operation.

OSHA has explicit standards which paint facilities must meet in order to protect personnel. In areas where toxic solvents may be used to prepare surfaces, the employer must provide a full enclosure for the operation. It must be properly ventilated, respiratory protective equipment must be provided for employees, suitable fire protection equipment must be available and only explosion-proof lights are permitted.

Actual painting areas of a shop must also provide full protection for the employee, according to OSHA. Such things as spray guns, paint pots and metallic parts of connecting tubing must be electrically bonded and the bonded assembly grounded to the vessel. Only non-sparking paint buckets are allowed, and all motors and control equipment must be the explosion-proof type. Metal parts of paint brushes and rollers must be insulated. Rubber, rather than plastic, gloves are required in certain operations because the plastic may give off static sparks. Clearly, when a railroad or a railroad supplier is preparing to open a new paint facility, there are many details to tend to before the first particle of paint reaches the surface of a freight car or locomotive.

● **Stencils need longer life.** All paint that reaches the surfaces of a freight car is not put there in large quantities. Stencils—which identify the car owner and/or lessee, provide vital details about the car and some of its components and give directions to repair forces—are becoming increasingly important because of certain requirements established recently by FRA. Although relatively small amounts of paint are needed for stenciling, the messages carried in the stencils are very big and important.

Stencil paints must be durable, especially since the AAR-imposed mandatory servicing interval for ABD brake equipment has been extended to 96 months. The stencil on the side of the car carrying information on maintenance of the brake equipment is an important one. Furthermore, some of the information which the FRA wants stenciled on the sides of cars must last at least eight to ten years.

Although railroads and rolling stock suppliers regard coatings and coatings application as among their major concerns, the fact remains that at least a portion of the new freight cars—and perhaps some of the locomotives, too—would not have to be coated at all. There are steels on the market today that actually oxidize and form their own protective coating. Uncoated freight cars are, in fact, in service today, and while they are performing satisfactorily, problems have been reported with rust-streaked stencils.

Some railroads, however, are making excellent use of the self-oxidizing steels in bridge construction and for other fixed installations. This trend is apt to continue, some feel, which means that perhaps the best chance a railroad bridge of the future may have of ever seeing anything resembling a dab of paint may be when an amorous young man elects to proclaim on it—in bold, runny letters—his profound love for Mary, or Suzie, or whoever. ■

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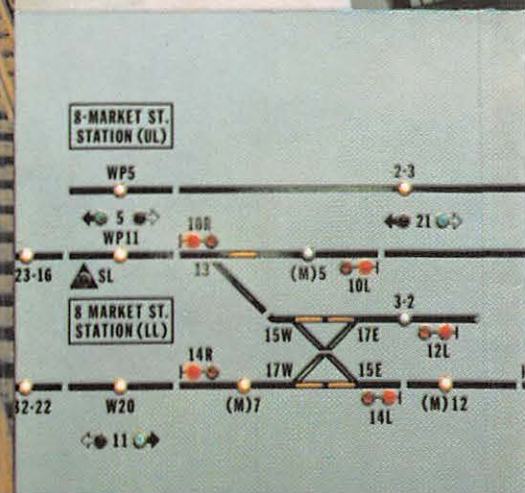

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New Products Report

Display controller interfaces between computer and teletype

The new Ann Arbor Terminals, Inc., add-on display controller permits addition of local, remote and multiple CRT display to existing teletypes. Called RO200D2, the controller interfaces directly between the computer and teletype, utilizing the current loop interface of each. Hence, no modems are required. The controller monitors the teletype's receive line and displays whatever the computer transmits. If the teletype is operating in full duplex or echoplex, the CRT display is identical with the teletype printout. A "print" command to the RO200D2 permits the computer data to be either displayed or printed, or both displayed and printed. Display formats of 32 x 16, 80 x 16, and 80 x 24 are offered, with a 64 ASCII alphanumeric character repertoire. An underline cursor is standard, plus switch-selectable PAGE and ROLL mode operation. A built-in MOS memory stores the full screen (up to 1,920 characters) of data. Single-quantity prices range from $890 to $1,170, depending upon display format and operating speed.

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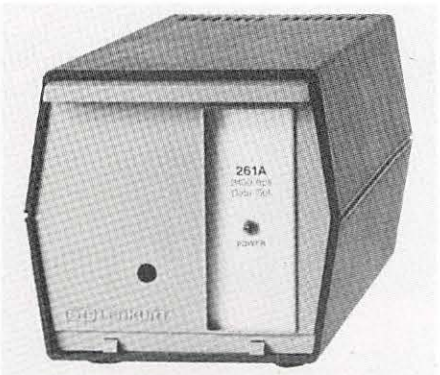

Low cost data set added to data communications systems

A new low cost data set has been added to GTE Lenkurt Inc.'s broad line of data communications systems. The set—261A 2400 b/s—uses the synchronous duobinary encoding technique combined with FSK modulation to transmit and receive data signals at 2400 bits per second, double the maximum voice channel binary rate. The compact set is particularly suited for full-duplex point-to-point, and half-duplex multipoint polled applications on a party line basis for communications between computers, business machines or in other applications requiring accurate transmission.

Operating over a type 3002 voice-frequency channel, C1-conditioned or better, the 261A is end-to-end compatible with existing GTE Lenkurt type 26C-30016 data sets equipped for the same functions. It incorporates both transit and receive equalization enabling bi-directional, independent circuit equalization. To speed up and simplify alignment and troubleshooting, the data set features built-in test facilities that include switchable compromise equalizers, VF and digital loopback switches and a random pattern generator.

Circle 61 on reader service card

Diesel fuel oil heater is virtually maintenance free

The Model F-588 Diesel Fuel Oil Heaters utilize engine coolant to warm fuel oil, improving the oil's viscosity and avoiding engine power loss due to paraffin accumulation in pumps, filters or injectors. The Vapor Corp. heater, self-regulating and virtually maintenance free, is easy to install. Two models have rated capacities of 65 and 245 gal. per hr.

Circle 62 on reader service card

Sound deadener reduces transit-car wheel screech

Viscoelastic vibration-damping materials have been applied to transit car wheels to reduce wheel screech. A five-layer ring, attached by an adhesive to the wheel rim, was found to produce at least a 31-decibel reduction in one test. A combination of extensional and shear damping was found most effective. The ring-shaped damper weighs less than 22 lb, adhesion is designed to last the life of the wheel, and the unit is protected so it is undamaged in switches and guard rails. Three transit systems have experimented with the treatment.

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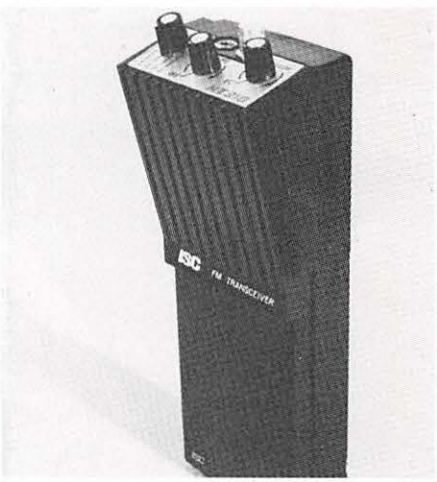

Hand-held transceiver offers high quality at low cost

A solid-state portable FM transceiver designed to provide quality performance at low cost has been announced by the ComData Division of International Signal & Control Corp. The transceiver, Model HT-910, is said to be ideal for rail transportation, fire protection, law enforcement, safety, construction and all applications needing portable, dependable communications. Model HT-910 meets all FCC type acceptance requirements. Equipped with five channels, it features a single conversion receiver, a monolithic crystal filter and solid state T/R switching. Plug-in crystals make channel change fast and easy. The transceiver is 1 9/16-in. deep, 3 1/16-in. wide and 8 5/16-in. high. It weighs about 1.625 lb. Price: $339.95.

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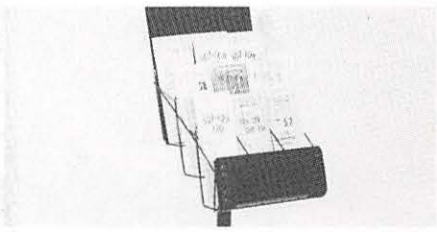


Timetable rack is available in any size, height or color

A new design of timetable rack has been announced by Melco Wire Products Co. Racks are available in any size, height or color and with any number of pockets for timetable folders. The racks, for indoor or outdoor use, can be made of any material, including plastics. Space is available on the racks for any type of advertising. The racks are available without stands for counter use.

Circle 65 on reader service card

People in the News

CANADIAN PACIFIC.—J.K. Dakin appointed vice president administration, Montreal, succeeding **W.J. Stenason.** Mr. Dakin will retain jurisdiction over personnel and pensions and will assume responsibility for the ocean shipping activities of CP. **J.C. Ames,** secretary of the company, Montreal, assumes jursidiction over the investigation, medical services and administrative services functions.

H. Eaton appointed assistant superintendent, Ottawa, Ont., succeeding **G.C. Sayer,** retired.

CHICAGO & NORTH WESTERN.—Richard W. Bailey, director of maintenance operations, named director maintenance planning.

John L. Stanek named assistant division manager-transportation, Lake Shore division.

Donald C. Bergquist, market manager—grain and grain products, Chicago, named regional sales manager, Minneapolis.

Douglas E. Oakleaf, assistant division manager-engineering, Twin Cities division, St. Paul, appointed director maintenance operations, Chicago.

Robert R. Lawton, senior staff engineer-maintenance administration, named engineer materials and testing. **Jeffrey S. Otto,** staff engineer-planning, appointed production control engineer.

DENVER & RIO GRANDE WESTERN.—R.N. Lehnertz named assistant superintendent of communications, Denver.

ERIE LACKAWANNA.—B.R. Kennedy appointed division storekeeper, Buffalo, N.Y., succeeding **P.G. Clayback,** who retired Feb. 28, after more than 49 years of service.

ILLINOIS CENTRAL GULF.—Gerald C. Stuckey, senior assistant vice president-traffic, named to the newly created position of resident vice president, Jackson, Miss., effective Apr. 1.

James R. Lynch appointed senior vice president-finance. Mr. Lynch was formerly senior vice president-finance, **Eastern Airlines.**

MISSOURI-KANSAS-TEXAS.—Walter R. Rooney appointed sales representative, New York, succeeding **Robert F. Gynn,** resigned.

E. Gerry Kasper appointed sales representative, St. Louis. Mr. Kasper has had traffic experience with the Nickel Plate, Erie and Chicago & Eastern Illinois. **Carmen P. Cacciatori** appointed assistant sales manager, Chicago, succeeding **Raymond E. Wille,** promoted.

MONONGAHELA.—David E. Gratz, division engineer, appointed superintendent, Brownsville, Pa., succeeding **Hugh J. Martin,** recently promoted to the **Penn Central.**

NAPIERVILLE JUNCTION.—Frederick N. Mercurio appointed manager of intermodal sales, Montreal. **Leon Hughto** named supervising agent. **George Fitzpatrick** appointed supervisor of TOFC services. **Joseph Bruno** named general agent.

NEW JERSEY DEPARTMENT OF TRANSPORTATION.—Peter E. Stangl appointed Assistant Commissioner for Public Transportation. Mr. Stangl had been administrator, Office of Management and Budget, New York City Transportation Administration.

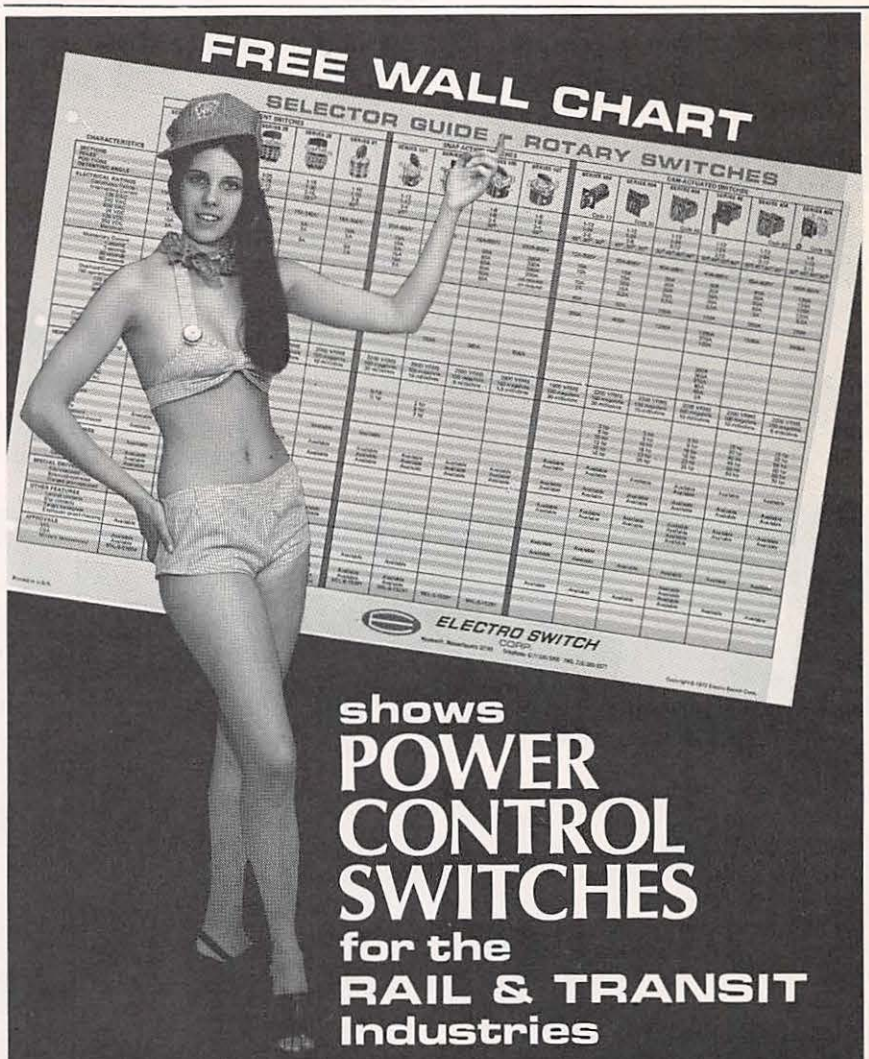
SANTA FE.—Stephen M. Anderson, operations analyst-operations research, named manager-transportation service, Chicago.

SOO LINE.—Charles H. Clay, general freight traffic manager-pricing and market development, appointed assistant to the president.

SOUTHERN PACIFIC.—Donal L. Praeger, assistant controller, named controller of the railroad and **Southern Pacific Co.,** with headquarters in San Francisco. Mr. Praeger succeeds **Herman H. Nelson,** vice president and controller, who retired Feb. 28 after more than 47 years of service.

Gerald C. Stuckey
ICG

Charles H. Clay
Soo Line



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The following appointment has been made at San Francisco: **E.L. Johnson,** assistant controller **R.J. Greenslade,** senior manager, collection services; **L.C. Yarberry,** senior manager, accounting operations; **J.P. Gallagher,** senior manager, expenditure accounting; **J.W. Keleher,** senior manager, equipment accounting; **F.B. Torley,** senior manager, revenue accounting; **A.A. Shapiro,** manager, central services; **L.E. Carroll,** acting manager, revenue services; **J.A. Harman,** acting manager, equipment accounting; **G.W. Robertson,** acting manager, revenue accounting; and **W.S. Saia,** acting manager, disbursements accounting: **R.J. Surginer** named audit manager, Houston.

TORONTO, HAMILTON & BUFFALO.—Michael J. Martino appointed general solicitor, Hamilton, Ont., succeeding **F.S. Weatherston,** resigned to become a judge of the Supreme Court of Ontario.

UNION PACIFIC.—Robert F. Pettigrew, vice president-executive department, retired Mar. 1 after 33 years of service.

Samuel G. Wilhoit named to the newly established position of district director-international trade, Kansas City. **Loren A. Springer** appointed representative-international trade, Denver, also a new position.

Robert L. Godfrey, freight traffic manager-staff, named to the newly created position of director-market development, Omaha.

WESTERN MARYLAND—John Krznaric, eastern sales manager, New York, appointed manager, foreign commerce, Baltimore, succeeding **C.L. Pfeiffer,** retired. **John W. Ryder** appointed assistant to manager, foreign commerce, succeeding **L.J. LoBianco. Ernest A. Lindsay,** division sales manager, Cumberland, Md., has retired after 44 years of service.

WESTERN RAILROAD ASSN.—Robert C. Kniewel appointed director of labor relations. Mr. Kniewel was previously manager of the Association's **Western Weighing and Inspection Bureau.**

Walter S. Aaron, Jr., director of budgets and controls, named controller, to succeed the late **Walter R. Nugent.**

TRANSIT

Thomas E. Wilson has been appointed senior civil engineer, Construction Division, **Niagara Frontier Transportation Authority** Buffalo, N.Y. He will be responsible for soils and geology, structure, tunneling, seismic consideration, architecture, utilities and mechanical equipment on the Buffalo-Amherst Metro rail rapid transit project.

Steward F. Taylor has joined the new transportation and mass transit department of **Sanders & Thomas, Inc.,** consulting engineering firm, Pottstown, Pa.

Charles E. Defendorf, chief rail advisor to the **Port Authority of New York & New Jersey,** has been elected president of **Seelye Stevenson Value & Knecht, Inc.,** New York. Mr. Defendorf succeeds **W.D. Alexander,** who will remain with the firm as vice chairman and consultant on special projects. Mr. Defendort was chief engineer, Penn Central, from 1968 to 1972.

American Bechtel Incorporated has opened a permanent Chicago-area office at 222 South Riverside Plaza. **Carl Goepfert** is manager of the office and directs personnel involved in engineering, construction, business development and project administration.

Robert H. Schoenfeld has been appointed a vice president of **URS/Madigan-Praeger, Inc.,** New York, a subsidiary of URS Corp. Mr. Schoenfeld is project manager for design work in connection with the $200 million Utica Avenue rapid transit line in Brooklyn. Mr. Schoenfeld was project engineer as well as resident engineer of Shea Stadium.

The **Toronto Area Transit Operating Authority** has been formed and will take over operation of the Ontario Government's GO Transit advisory agency.

Dr. E.S. Diamant has been appointed chief of the Transportation Technology Group, **De Leuw, Cather & Co.** and will be based in the newly established Los Angeles office. Dr. Diamant served until recently as director of transportation technology and planning for **TRW Inc.**

SUPPLIERS

Evans Products Co. has formed a transportation systems and industrial group and a

(Continued on page 52)

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Market Outlook

CARLOADINGS

Loadings of revenue freight in the week ended March 23 totaled 533,810 cars, according to the Association of American Railroads. This was an increase of 10,346 cars, or 2.0%, compared with the previous week, and an increase of 22,038 cars, or 4.3%, compared with the corresponding week last year. Ton-miles generated by carloadings in the week ended March 23 are estimated at 17.0 billion, an increase of 7.3% above the corresponding week of 1973.

REVENUE FREIGHT CARLOADINGS

Commodity	Mar. 23 week	Mar. 16 week
Grain	29,699	29,320
Farm products	11,501	11620
Metallic ores	26,304	27,426
Coal	95,448	85,424
Crushed stone, gravel & sand	26,427	26,000
Nonmetallic minerals	14,262	15,614
Grain mill products	20,761	21,499
Food and kindred products	24,073	24,220
Primary forest products	25,196	26,789
Lumber & wood products (except furniture)	16,658	15,825
Pulp, paper & allied products	23,796	23,549
Chemicals & allied products	30,824	30,834
Petroleum products	8,792	8,811
Stone, clay & glass products	21,691	21,849
Coke	8,851	7,476
Metals & products	28,355	28,035
Motor vehicles & equipment	22,191	21,303
Waste & scrap materials	18,202	18,405
Forwarder & shipper assn. traffic	11,592	11,626
All other carloads	68,765	67,825
LCL traffic	422	375
Total cars loaded	**533,810**	**523,825**
Cumulative total, 12 weeks	1974	1973
	6,130,518	6,033,843
Estimated revenue ton-miles (billions) 12 weeks	194.5	187.4

PIGGYBACK LOADINGS

U.S. piggyback loadings for the week ended March 16 totaled 34,019 cars (12.2% above the corresponding week last year) and 58,476 trailers or containers (up 10.7% from 1973). Cumulative volume for the first 11 weeks of 1974 is 351,235 cars (up 14.2% from last year) and 607,890 trailers or containers (up 15.0% from 1973).

IN CANADA

7 days ending	Tons of Revenue Freight	Cumulative Totals
March 7, 1974	4,319,107	37,158,342
March 7, 1973	4,180,348	38,252,668

● *CP Rail.*—Ordered 50 3,000-hp diesel-electric locomotives from General Motors of Canada at a cost of $26.6 million.

● *Chicago & North Western.*—Ordered 25 3,000-hp SD40-2 diesel-electric units from EMD at a cost of $9.6 million, with delivery scheduled for September. Over the past 10 months, C&NW has ordered 90 such units.

● *Trailer Train.*—Directors approved acquisition of 1,660 new flat cars at a cost of $42 million. Orders will be placed with Bethlehem Steel, Pullman-Standard and Thrall Car.

● *Union Pacific.*—The 1974 rolling stock program calls for 120 new locomotives and 3,395 new freight cars. The latter will include 940 box cars, 500 100-ton open-top hopper cars, 1,250 100-ton covered hopper cars, and five 100-ton flat cars—all to be purchased from outside builders. In addition, 600 box cars and 100 flat cars will be constructed in UP's Albina, Ore., shops.

● *Freight-car orders and deliveries.*—The following report has been received from the AAR and the ARCI:

DELIVERED

	Feb. '74	Jan. '74	Feb. '73
Built new by carbuilders	3,876	5,701	4,191
Built new in R.R. shops	127	161	284
Built new—total	4,003	5,862	4,475
Rebuilt	41	59	60
TOTAL DELIVERED	**4,044**	**5,921**	**4,535**

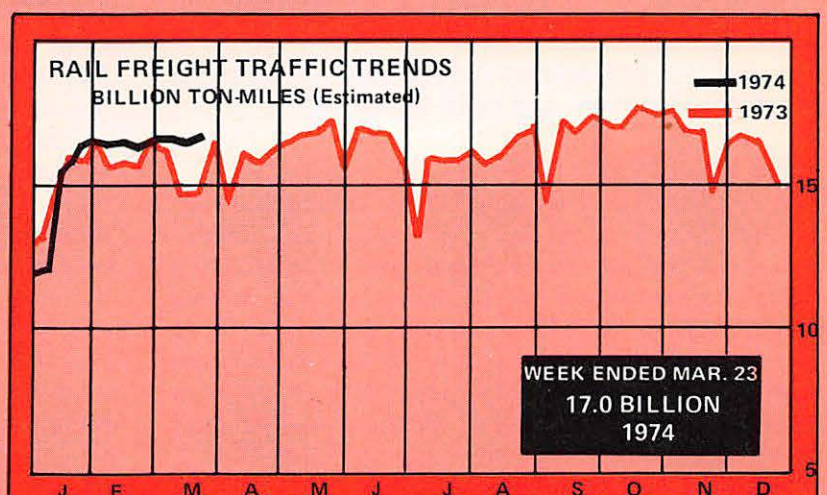
ORDERED

To be built new by carbuilders	6,231	8,921	8,661
To be built new in R.R. shops	500	2,325	1,150
To be built new—total	6,731	11,246	9,811
To be rebuilt	0	-125*	0
TOTAL ORDERED	**6,731**	**11,121**	**9,811**

ON ORDER AND UNDELIVERED

	Mar. 1, '74	Feb. 1, '74	Mar. 1, '73
To be built new by carbuilders	70,922	68,689	23,545
To be built new in R.R. shops	4,306	3,933	2,589
To be built new—total	75,228	72,622	26,134
To be rebuilt	541	582	615
TOTAL ON ORDER	**75,769**	**73,204**	**26,749**

*Previously placed orders cancelled.



Source: Association of American Railroads

Moving People

CHICAGOLAND VOTES FOR RTA—BARELY

It appears that the six-county Chicago metropolitan area will indeed have a Regional Transportation Authority, in the wake of a referendum through which RTA barely squeaked (RA, Jan. 14, p. 27). Outlying counties voted overwhelmingly against the proposal—in one county by as much as 12-to-1. But Chicago went just as strongly for it, and the 265,000-vote "pro" margin rolled up in the city was enough to get RTA approved. Still, some foes of RTA were talking of a court test, and a few suburban politicians were even talking about trying to "secede" from the Authority.

TURBOS FOR FLORIDA?

The budget Florida Gov. Reuben Askew has submitted to the State Legislature includes $4.2 million to cover the state's two-thirds share of the anticipated cost of providing turbotrain service between Miami and Orlando. Florida has for some time been trying to interest Amtrak in providing turbo service, which would be similar to that which Amtrak is now offering between St. Louis and Chicago with French-built (ANF-Frangeco) turbos (RA, Oct. 8, 1973, p. 28).

10-YEAR PLAN PROPOSED FOR CLEVELAND AREA

A 10-year, $1-billion program for improving rapid transit in the 5-county Cleveland area has been proposed by the local Urban Transportation Task Force. Included are plans for extending the Cleveland Transit System rapid transit from Windermere Station to Mentor, from University Circle Station to Warrensville Center road, and to Bedford, Parma, and Westlake via I-90; building a new rail line between downtown Cleveland and the University Circle area; and extending the Shaker Heights rapid transit line to I-271 on the north branch and to North Randall on the south branch. Also included in the plan is a $95-million expenditure for replacing or refurbishing buses and rapid transit cars.

RAPID TRANSIT FOR DETROIT?

The Southeastern Michigan Transportation Authority (SEMTA) is proposing a 254-mile, $2.4 billion high-speed bus and rapid transit system to serve the Detroit metropolitan area. Most of the money ($2.05 billion, in 1973 dollars) would go for a 75-mile rapid transit segment, of which 37 miles would be subway, 10 miles aerial, and 28 miles at grade—all but three miles of which would be built within existing highway and railroad rights-of-way. In releasing the recommendation March 21, SEMTA commented: "The people of Baltimore, Atlanta, San Francisco and Pittsburgh have found ways to finance their modern transit systems. If they can do it, we here in Detroit can do it just as well." In addition to rapid transit, the plan calls for improved local and feeder bus service, and extensive use of express busways.

FRANCE PLANS HIGH-SPEED ELECTRIFIED LINE

The French Government has approved construction of a new high-speed rail link between Paris and Lyon, to be used exclusively by passenger trains averaging 165 mph. To be completed in 1980, the $460-million line will cut travel time between the cities to two hours. After considering turbotrains, French National Railroads decided to electrify the line, noting that despite the advantages of a turbo, "its energy consumption per seat is 40% higher than that of an electric train. With energy cost constituting 12% of operating cost and probably 15% and even 16% in view of increasing fuel prices, electrification which requires heavy investments will probably prove cheaper in the long run."

ROHR RESUMES DELIVERY OF BART CARS

Rohr Industries Inc. has resolved its latest dispute with Bay Area Rapid Transit and resumed shipment of transit cars. BART called 28 Rohr cars "unacceptable" last January, because of problems with the seats which Rohr now claims to have corrected. Some 280 cars had been delivered to BART of the 450 contracted before BART announced its embargo.

PASSENGER RAILROADS ANNOUNCE FARE HIKES

It's going to cost more to ride the rails beginning in April, as costs continue to soar despite unprecedented numbers of riders. A widely-publicized Amtrak fare increase of 5% may bring in $12 million in new annual revenues. Southern Railway has asked for a 15% increase in basic passenger fares and a 5% increase in first class fares, noting that "to recover the full amount of increased costs it would be necessary to increase our passenger fares and charges across the board by over 17%." And to the north, Canadian National has announced it intends to boost its passenger fares 15%.

JAPANESE TO BUILD HONG KONG SUBWAY

Hong Kong is getting ready to go to work on its billion-dollar subway. A Japanese consortium headed by Mitsubishi Corporation is contracting for the first four stages of the 12.6-mile, 20-station system, linking Hong Kong with the Kowloon peninsula.

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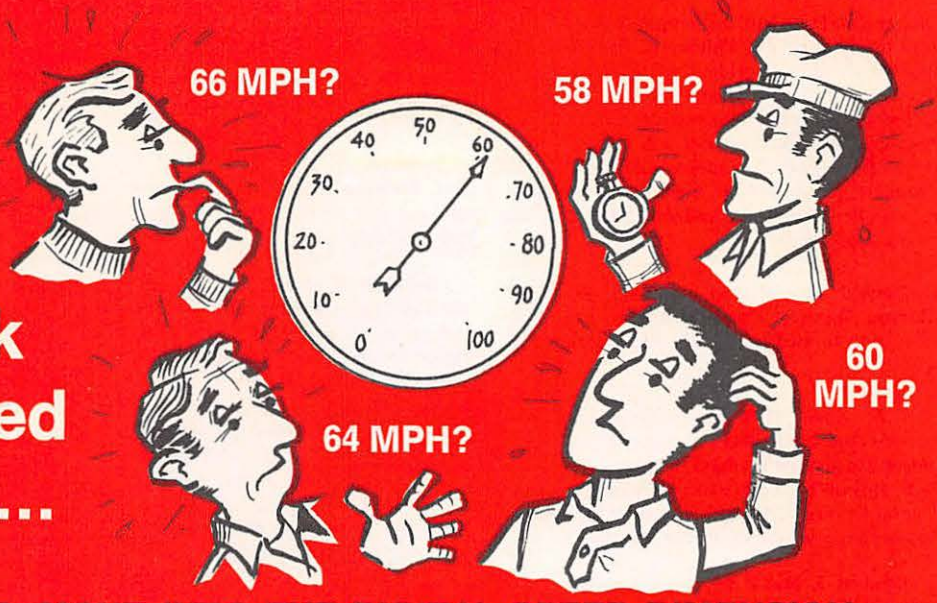

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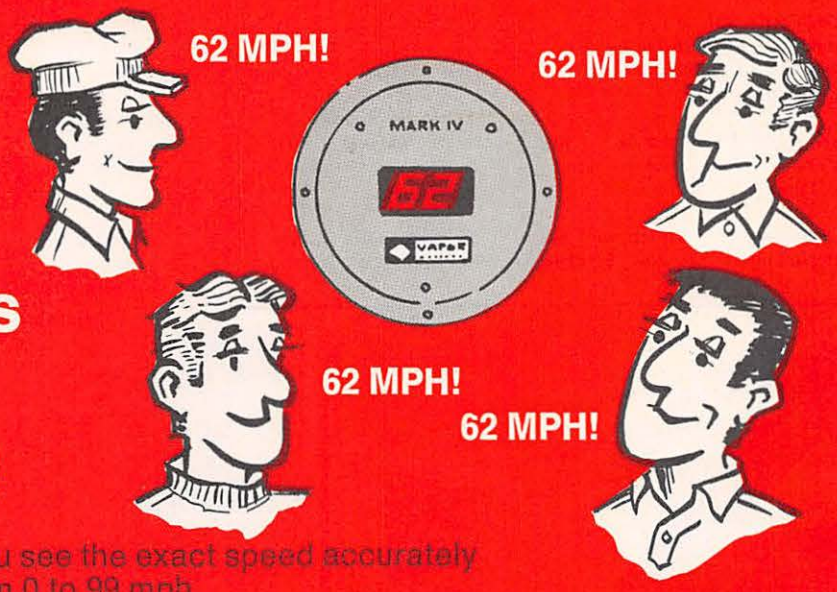

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Circle 21 on Reader Service Card

(Continued from page 48)

shelter products group to replace the industrial products group. **William C. Finkenstaedt** has been named president of the transportation systems and industrial group, and **John C. Felten,** executive vice president and general manager. Mr. Finkenstaedt will also be president and general manager of the shelter products group and Mr. Felten will continue as president of **U.S. Railway Mfg. Co.,** an Evans subsidiary.

Donald E. Barton, general manager, **Chicago Railway Equipment Co.,** has been promoted to vice president and general manager.

C.F. Kaye, chairman, **XTRA, Inc.,** has become president. **W.F. Daugherty** has been appointed general manager, Railroad Division. **W.B. Russell** has been named general manager, Container and Chassis Division. **P.M. Brown** has been named director of marketing.

Edward J. Malek has been named service engineer, **Standard Railway Equipment Division, Stanray Corp.**

Louis I. Dethloff, assistant director of purchasing, **American Steel Foundries,** has been named director of purchasing, to succeed **M. Duane Compton,** retired.

John R. Turk, general sales manager, **Ohio Brass Co.,** has been elected vice president-sales, Mansfield, Ohio.

David D. Wellington, superintendent, Locomotive Department, **General Electric Co.,** Erie, Pa., has been named manager-transportation service, Apparatus Service Division.

John W. Aquadro, vice president-systems, **Howe Richardson Scale Co.,** Clifton, N.J., has been appointed vice president-engineering.

Lambert R. Butzen, assistant vice president, **Pullman Incorporated,** has been named assistant vice president and director of industrial relations.

Greyson P. Lewis, Jr., assistant safety administrator, Amcar Division plant, **ACF Industries,** Huntington, W. Va., has been appointed corporate labor relations representative, St. Charles, Mo.

Richard B. Whalen has been named vice president and director of **Thomas K. Dyer, Inc.,** consulting engineers, Lexington, Mass. Mr. Whalen has served for 21 years with the **Boston & Maine** and **Maine Central** in signal and communications design, construction and maintenance.

Frank Shope has been appointed plant manager, Renovo, Pa., **Berwick Forge & Fabricating,** a division of Whittaker Corp. Mr. Shope was formerly chief estimator at Berwick.

David N. Snyder has been appointed vice president-marketing, **Nife Inc.,** Copiague, N.Y. Mr. Snyder was formerly marketing manager.

Jerry R. Ludwig has been named senior product engineer, Railroad Sales Department, **CF&I Steel Corp.,** Pueblo, Colo. Mr. Ludwig was formerly owner of **Arcar Railroad Supply Co.**

Wm. C. Finkenstaedt
Evans Products

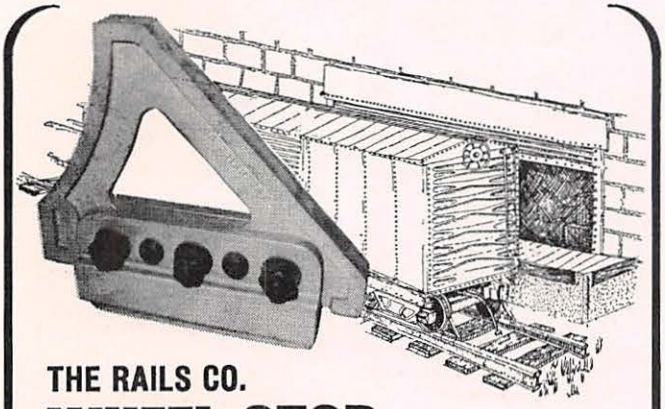
John C. Felten
Evans Products

Oliver C. Fuller has been named assistant general manager, **Chicago Railway Equipment Co.** and will assist with the operation of facilities in Chicago and Woodstock, Ill. Mr. Fuller was formerly general manager, Woodstock plant.

Ex-Cell-O Corp. has relocated its executive offices at 2855 Coolidge Street, Troy, Mich. 48084.

OBITUARY

John H. Chandler, 64, unit and parts representative, **Alco Engines Division,** White Industrial Power Inc., died March 3 at his home in St. Louis, Mo.



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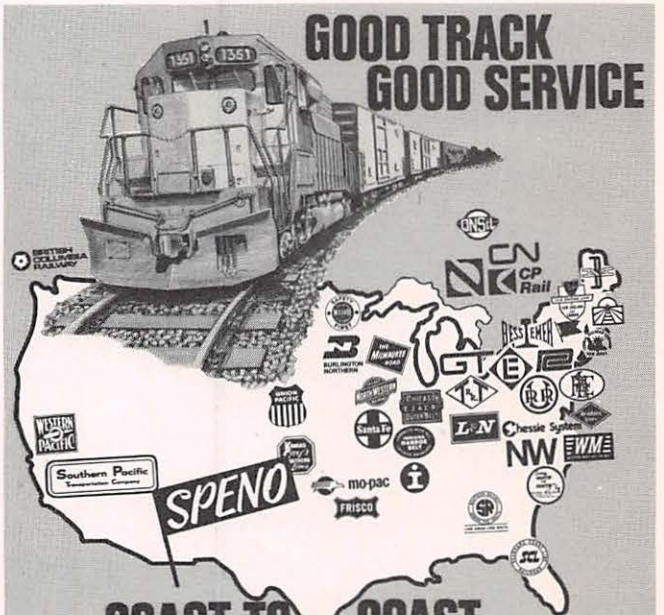

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Viewpoint

Real-time decisions, not just postmortem analysis

Just about everybody knows the tragic story of John Henry—but not so many folks, probably, know the updated version of the tale. That's the version done a few years ago by a couple of folksingers named Gibson and Camp, in which John Henry, the legendary railroad folk-hero, is matched not against a steam-drill but against a computer. And there was John Henry, thinking and thinking and thinking till his brain dropped dead—while the computer went merrily about its task, humming "Nearer, My God, to Thee."

There have been times, no doubt, when superintendents and trainmasters and yardmasters from one coast to the other have felt like old John—trying to match wits with an Almighty kind of machine and finding it a frustrating (if not necessarily fatal) experience.

One problem, of course, was that in the early days of computerization in railroading, too many operating people and too many systems people simple failed to hit it off. Systems people seemed sometimes to be deliberately trying to talk over the head of whomever they were talking to. Systems people seemed sometimes to lack the understanding that theirs was a service function, a problem-solving function. Operating people were by no means blameless. Some honestly couldn't figure how the computer could help. Some didn't want it messing around with the "mystique" of running a railroad. Some simply didn't want a bunch of fresh-kid M.B.A.s poking around and making suggestions.

Slowly, however, things are coming around. Slowly, operating management has built up its confidence in information systems that have evolved. Slowly, line management has found that the systems really can help in the planning and managing of operations.

What both systems and operations officers have been concerned with thus far, however, is essentially the computer in its management-information function. Coming along now is the computer in a process-control function—and the possibilities look exciting. Coming along in parallel is a significant increase in the amount of simulation and modeling being done. Both of these elements are of tremendous long-term significance to operating personnel.

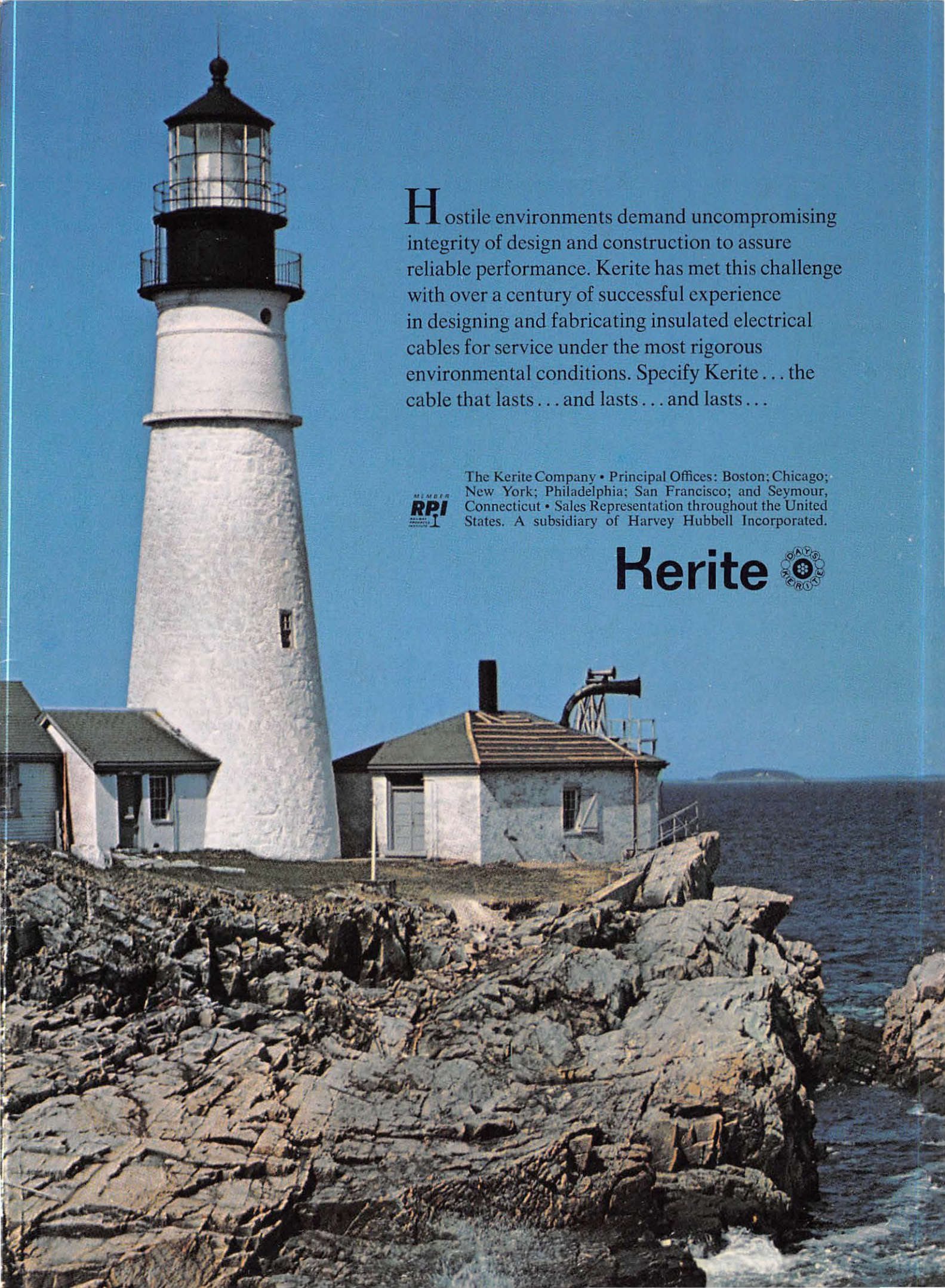
With improved simulation techniques, it should be possible to gauge the impact of virtually any proposed move or change in the operating area without actually having to make the move or change. Operating a railroad will never be a no-risk business. But simulation can help it become a lower-risk business.

By the same token, more widespread use of process-control computers—not just in hump yards, but in flat yards, in dispatching and even in operation of the train itself—can help to tighten up the operation, to make it more precise, more sure.

COMPUTERS ARE HERE TO SERVE—NOT REPLACE—MAN

In the early days of computerization, the machine got most of the attention and man not very much. That was one of the bigger mistakes of those early days—but it is one that systems people are determined not to allow to be repeated. Computers, they declare, are here to serve, to supplement, to complement man—not to replace him.

Hopefully, the new wave of computer application can take place with less pulling and tugging than accompanied the first wave. When you think of what's at stake, in terms of potential operating improvements, it just can't be any other way.



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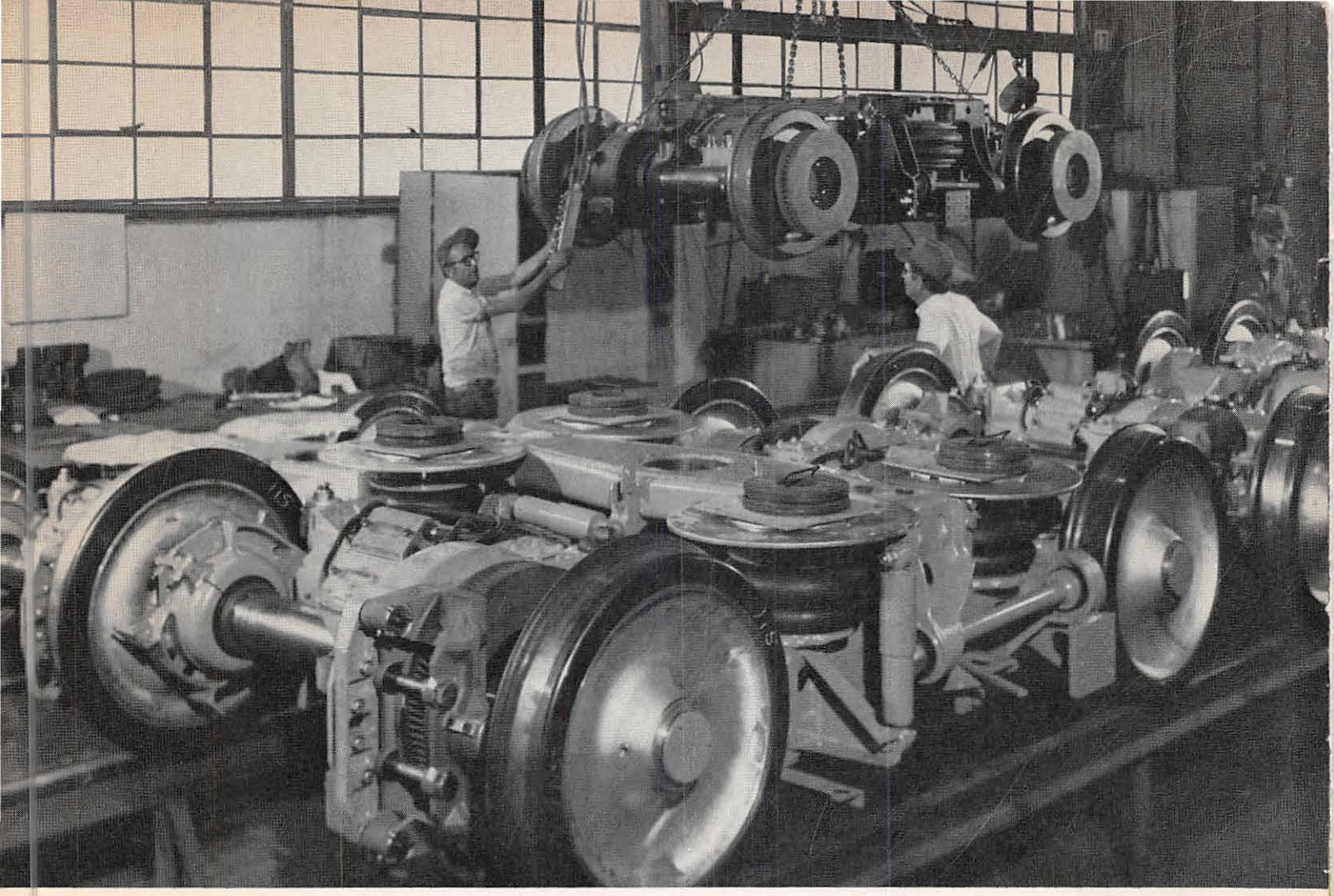

BART meets WMATA in Atchison, Kansas.

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The BART truck (foreground) uses 4-bellows air springing, aluminum-centered wheels, and inboard axle-mounted disc brakes: design criteria for the WMATA cars led to two air springs, with the disc braking system outboard of the steel wheels.

But both use the patented Rockwell spherical bearing equalization feature, proven in years of service and the key to Rockwell's reputation for light weight, competitive truck performance.

Modern rail transit systems will be moving more and more people in the years ahead: we're proud to be lending a Kansas hand.

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